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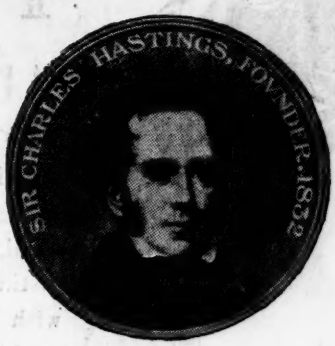

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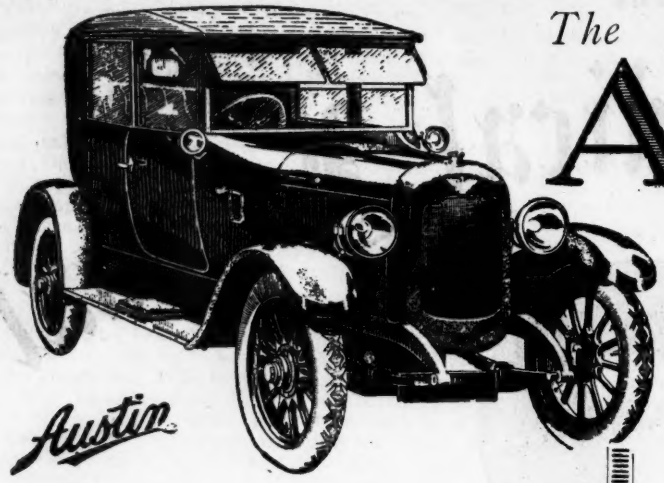

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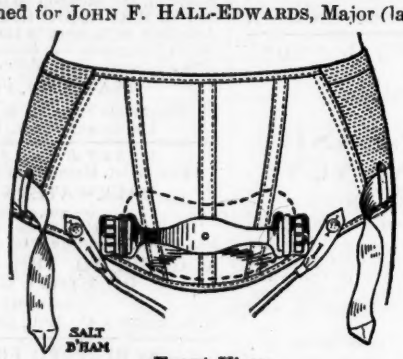

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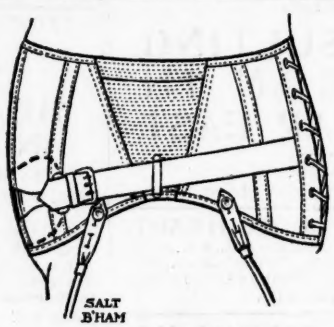

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ON

WILLIAM HARVEY, OBSTETRIC PHYSICIAN AND GYNAECOLOGIST.

DELIVERED BEFORE THE ROYAL COLLEGE OF PHYSICIANS OF LONDON ON OCTOBER 18TH, 1921,

BY

HERBERT R. SPENCER, M.D., B.S.LOND., F.R.C.P.,
OBSTETRIC PHYSICIAN TO UNIVERSITY COLLEGE HOSPITAL.

(With Special Plate of the Canterbury Portrait of Harvey.)

MR. PRESIDENT AND FELLOWS,—When you, Sir, did me the high honour of nominating me to give the Harveian Oration I was elated as an obstetric physician, depressed as the prospective orator. That you, Mr. President, should deem the obstetrical and gynaecological work of Harvey worthy of special commemoration was not surprising since, as a learned *alumnus* of Harvey's school and our chief historian of medicine, you are aware that sufficient attention has not been directed to that part of Harvey's life-work which can be appreciated best by an obstetric physician.

The compliment which you have have conferred by your nomination is highly appreciated by myself and by my obstetric and gynaecological brethren. It is not so very long ago that one who, in the words of the learned and sympathetic Regius Professor of Physic, Sir Clifford Allbutt, "had been taken in the act of laparotomy and kept on doing it," would have been considered unfitted to give the Harveian Oration. Yet Harvey, the greatest Fellow of this College, performed operations, sometimes of considerable gravity, though he did not magnify the position of operations, which are indeed the most facile and least noble part of medicine. For three hundred years many of the chief practitioners of midwifery and gynaecology have held the time-honoured title of physician, and I find no worthy reason why they should call themselves surgeons, although, like Harvey, they are sometimes called upon by the nature of their work to perform operations.

Before proceeding to the main purpose of his oration, which was to depict Harvey as an obstetric physician and gynaecologist, the orator made a digression to give an account, founded on Miss Mary F. S. Harvey's recent book, *The Life, Correspondence, and Collections of Thomas Howard, Earl of Arundel, "Father of Vertu in England,"* of Harvey's activities as physician to the Earl's Embassy to the Emperor Ferdinand II at Vienna, and as picture-buyer for Charles I. The Embassy was absent from England from April 8th to December 27th, 1636. The Earl, writing from Ratisbon on July 20th, said, "Honest little Harvey is going a little start into Italy, and I give him some employment . . . about pictures for His Majesty." Harvey was put into quarantine and "miserably vexed" in the lazaretto at Treviso. He had to lie out on the grass or sleep on a straw bed "in a little poore garden howse full of lumber, durt, and knatts without window or dore, open to the highway att midnight." Three days later he wrote, "I have a sciatique in my right thigh and legg that much discourageth me and maketh me lame." Harvey at this time was 58 years old. He was not successful in buying pictures, but nothing damped his enthusiasm for research, for, according to Aubrey, "Harvey would still be making of excursions into the woods making observations of strange trees and plantes, earths, etc., and sometimes like to be lost. So that my Lord Ambassador would be really angry with him for there was not only danger of thieves but also of wild beasts."

Frontispiece of the first (Latin) edition of Harvey's *De Generatione Animalium*, published in London, 1651. The inscription on the egg which Jove is opening is "Ex ovo omnia."

Passing next to fulfil the injunction to commemorate past benefactors by name, the orator said that it was his duty "to enrol amongst the list of benefactors an obstetric physician, the late Dr. Lloyd Roberts of Manchester, who bequeathed a sum of £3,500 to the College and 1,800 medical books, including 50 incunabula and an almost complete set of the editions of *The Byrth of Mankynde*, the first book on midwifery to be translated into English." "In bequeathing these gifts," Dr. Spencer said, "Dr. Lloyd Roberts has set an example to other obstetric physicians, and I am but carrying out the injunction of Harvey in exhorting them to follow that example, so that our College, whose immortal Fellow wrote the first original English work on midwifery, shall have in its library the best collection of books dealing with the functions and diseases of women.

"That distinguished Fellow of the College, Sir Thomas Browne, in speaking of the value of the College library, specially recommended the work of the Paduan teachers — Vesalius, Spigelius, Bartholinus, Falloppius, and Fabricius —adding, 'Be sure you make yourself master of Dr. Harvey's piece, *De Circulatione Sanguinis.*' The other great work of Harvey is the *De Generatione Animalium*, containing the chapter *De Partu*.

"It was the activity of anatomists in research on the female generative organs which aroused Harvey's interest in obstetrics and gynaecology, and, bearing in mind the value of the tradition of a medical school in moulding the character and the work of a physician, I need make no apology for briefly reviewing the obstetrical and gynaecological writings of the school of Padua, whither Harvey went to study in the year 1600."*

* Sir Thomas Barlow, Harveian Oration, 1916.

PADUAN TEACHERS IN THE SIXTEENTH CENTURY:

THEIR CONTRIBUTIONS TO OBSTETRICS AND GYNAECOLOGY.

Padua was at this time the most distinguished university in Europe. Thither flocked the eager students, especially of medicine, to learn from the most celebrated teachers in the world. Since the memorable siege of Maximilian in 1509, when its citizens, men and women, had performed prodigies of valour, it had enjoyed profound peace, sheltered by the wings of the dreaded Lion of St. Mark. Besides its admirable teachers Padua had other attractions. It was a healthy town, and was a very cheap place to live in. Montaigne, who visited it in 1580, found that he could live well and in good company for 7 crowns a month, fire and lighting only excepted, and gives the low cost of living as one reason why so many students and others resided there; Evelyn, who visited it in 1646, also notes that provisions were remarkably cheap.

From contemporary prints, one of which is reproduced here, we can see what the University building—the "Gymnasium omnium Disciplinarum"—was like. The handsome façade of this Renaissance building was repaired during Harvey's student days, as we learn from a memorial tablet dated 1601. Over the gateway was the stemma of a Doge of Venice,* and beneath it the Lion of St. Mark. Both these have since been taken down and—to the detriment of the appearance of the building — replaced by the Royal Arms of Italy. There still remains, however, the legend, "Sic ingredere ut te ipso quotidie doctior evadas," an injunction which Harvey so faithfully obeyed. Passing through the gateway, we come to the courtyard with its celebrated cloisters in two tiers. In these cloisters, with their vaulted roofs, the "stemmata" of distinguished students were painted, amongst them that of Gulielmus Harveius. Aubrey has given us a portrait of Harvey in his younger days. He was "of the lowest stature, round-faced, olivaster (like wainscott) complexion; little eie, round, very black, full of spirit: his hair was black as a raven, but quite white 20 years before he dyed. . . . He was always very contemplative, and said he did delight to be in the dark as he could then best contemplate." He was indeed one of those of whom Cicero speaks *quibus vivere est cogitare*, and one can picture him deep in study in the cool and shadowy cloisters of the University, even as later he had caves made in the earth near his house at Combe in Surrey, in which in summer time he delighted to meditate.†

Padua. Façade of the University building early in the seventeenth century. The inscription over the entrance reads "Gymnasium omnium disciplinarum," and that higher up "Sic ingredere ut te ipso quotidie doctior evadas." (From Guzzoni's *L'Italia Ostetrica*, 1911.)

Among the teachers at Padua who influenced Harvey was Galileo, who had been appointed professor of mathematics in 1592, and continued to hold the office for eighteen years. Galileo had been a medical student, and was a critic of the Aristotelian philosophy; it was by the beats of his pulse that he timed the oscillations of the swinging lamp at Pisa which led to the enunciation of his pendulum law and the construction of the astronomical clock. Francesco Barberini, the nephew of Pope Urban VIII (at whose instance Galileo was tried by the Inquisition), showed Harvey much attention at Rome, and probably pointed out to him the Baldachino in St. Peter's, on the pillars of which Bernini carved, in the stemmata of the Barberini family, the face of a woman expressing the emotions of the various stages of labour. Galileo was the first to give lectures in the Italian language. We learn from Aubrey that Harvey was "pretty well versed in mathematiques, and had made himself master of Mr. Oughtred's *Clavis Mathematicae* in his old age; and I have seen him perusing it and working problems not long before he dyed, and that book was always in his meditating apartment." It is not improbable that he received his first lessons in exact observation and sustained argument in the lecture room of Galileo.

Of those Paduan teachers who wrote on obstetrics and gynaecology, Vesalius (1514–1564), the Reformer of Anatomy, is first in time and importance. He gave the first adequate description of the pelvis, and described also the form, position, connexions, and muscles of the uterus and its changes during pregnancy. Falloppius (1523–1562) described the oviducts or tubes known by his name, although they had been observed by Herophilus, Rufus, Soranus, and Galen. Realdus Columbus (1494–1559), a practical obstetrician as well as anatomist, gave the first correct description of the lie of the foetus. Aranzius (1530–1589) in his *De humano foetu liber* (1571) gave a detailed description of the uterus, placenta, and membranes. He was the first to describe deformity of the pelvis, and to state that the placenta was not always attached to the fundus uteri, and that as the placenta ("jecur uterinum") intervened between the foetal and maternal vessels there could be no communication between them.

Hercules Saxonia, Professor of Practical Medicine at Padua, where he taught from 1590 to 1607, wrote on conception and diseases of women; but Fabricius ab Acquapendente, who succeeded Falloppius at Padua, was Harvey's special teacher and guide. He made many researches in comparative embryology. He studied the placenta in various animals, delineated the decidua, and figured the cord around the neck of the foetus. Eloy says of him, "The degree of doctor of medicine with which he was honoured did not prevent him from publicly performing surgical operations." He taught for about fifty years at the school of Padua, and died there in 1619, universally regretted, at the age of 82. He refused fees, and put the presents his patients sent him into a cabinet labelled "lucri neglecti lucrum." He built an anatomical theatre at Padua at his own expense, which generous act prompted the signory of Venice to build a much more spacious amphitheatre in his honour.

Casserius (1545–1616), a servant of Fabricius, who was educated and advanced by him to be his pupil and assistant, employed two distinguished artists, Edoardus Fialettus and Franciscus Valesius, to draw and engrave his preparations. When he died in 1616 he was succeeded in the chair of anatomy by Spigelius, whose work *De formato foetu* (quoted by Harvey) was published by Crema in 1626, the year after his death.

Mercurialis (1530–1606) was born in 1530, about ten years before Mercurius (Scipione Mercurio), with whom he is sometimes confounded. He taught at Padua for eighteen years, was created a Knight of St. Mark, and amassed a fortune of 120,000 golden crowns. His most celebrated book is *De arte gymnastica* (1569), but many others were published by his pupils. He wrote an important work, *De morbis muliebribus*, which was published in the collection of all the ancient and modern works on obstetrics and gynaecology, entitled *Gynaecia*, the third and most complete edition of which was published by Israel Spachius in 1597, three years before Harvey went to Padua.

Mercurius ("Scipione Mercurio,") was born in Rome about 1540 and died in 1616. He studied medicine at Bologna and Padua; he devoted himself to theological studies, and entered the Dominican monastery at Milan

* The stemma is that of the Cigognas, who conferred many benefits on the university. Pasquale Cigogna, Podesta of Padua, and Doge of Venice from 1585 to 1595, was descended from an apothecary who was called up to the Great Council after the Chioggian war in 1380. (Letter from Professor Guzzoni of Modena, and Haslitt's *Republic of Venice*.)

† The Earl of Arundel had similar caves made in the grounds of his house at Albury; on one occasion a cave collapsed shortly after he and Oughtred, the mathematician, had left it.

but continued to occupy himself with the study of medicine; finding his monastic life did not afford him sufficient opportunities for the practice of medicine, he quitted the monastery and travelled in France and Spain in 1571 and 1572, as physician to a German officer, Hieronymus de Ladrone. On his return to Italy he practised with great success in Padua and settled in 1601 in Venice, where he lived for fifteen years. He wrote *La Comare o Ricoglitrice*, the first Italian work on midwifery. It contains chapters on Caesarean section on the living patient, which operation he introduced into Italy. It is illustrated by drawings, one of which is reproduced here. He relates that in his travels in France he had seen two women in Toulouse who had been delivered by Caesarean section, one of whom had since been happily delivered nine times. To commend the operation to his countrymen he wrote that it was as well known in France as bleeding for headache in Italy. This passage was erroneously rendered by Welsch, who published a German translation of *La Comare* in 1653, "so gewöhnlich in Frankreich als das Aderlassen in Italien"—"as *common* (or *usual*) in France as bloodletting in Italy"—whereas Scipione Mercurio only said it was *as well known*. This error has been often repeated by subsequent writers and has been used to throw doubt on Mercurio's accuracy. In this work Mercurio is the first author to mention contraction of the pelvis as an indication for Caesarean section. It contains a description and illustration of the "hanging-legs" position for delivery in cases of contracted pelvis, which Walcher published in 1889 as something new, and also a description of the operation of bimanual version, generally associated with the name of the late Dr. Braxton Hicks. It was long thought that *La Comare* was published in the beginning of the seventeenth century; according to Haller the first edition was published in 1604; and others have given 1601 as the date of publication. Research, however, has shown that the first edition was actually published in 1596 (the second and third parts being dated 1595). This edition is extremely rare, only four copies being known to exist—three in Italy and one in this country; its title-page is reproduced. It is interesting to find that the first Italian book on midwifery was a *cinque cento* production, and was published by a Paduan obstetrician four years before Harvey went to that University. It can hardly have failed to arouse Harvey's interest, must have had an effect in popularizing Caesarean section on the living, and may have been the stimulus to Harvey to emulate the Paduan obstetrician by writing his *De Partu*, which was the first original English work on midwifery.

I hope I may be pardoned for referring to these great teachers of the Paduan School. It was under the influence of these men, who had shown their interest in the subjects of embryology and midwifery, that Harvey was led to write his great work on generation and labour. In order to appraise this work it is necessary to consider the position of obstetrics at the end of the sixteenth and the beginning of the seventeenth century.

OBSTETRICS IN THE SIXTEENTH AND SEVENTEENTH CENTURIES.

Italy was the first country in Europe to encourage anatomical research. At the School of Salerno in 1238 it it was ordered that every five years a human corpse should be dissected before the students of medicine and surgery, and in 1442 two corpses were annually provided free of cost for dissection in the University. In Mundinus's work on Anatomy written in 1316 is the first description of the dissection of the human body since ancient times. The progress of anatomical study in Italy was favoured by the ancient Lex Regia, which enacted that no pregnant woman should be buried until the foetus had been cut out of the womb, and by the ritual of the Roman Catholic Church, which prescribed "if a pregnant woman die the foetus shall be cautiously extracted as soon as possible, and, if alive, shall be baptized"; which led to a great extension of the operation of Caesarean section on the dead, especially during the frequent epidemics of plague.

The common belief that the Church in Italy obstructed anatomical research as, for instance, by the celebrated Bull of Boniface VIII (1303), has been disproved by Filippo Lussana, professor of physiology in the University of Padua, who shows that the Bull of excommunication was directed against those who for gain disembowelled corpses and boiled them so that the bones could be buried in their native land, and not against dissection by doctors, for Benedict XIV expressly states in his "Institutione" dealing with the Bull, "Quamobrem membrorum incisio minime interdicitur quae adeo necessaria est medicinae facultatem exercentibus." In Curatulo's work, *L'arte de Juno Lucina in Roma*, many instances are given of the favour extended by the heads of the Church of Rome to anatomical research, even to the extent of leaving their own bodies for the purpose, and the good influence exerted on the practice of midwifery is shown by the celebrated Bull of Sixtus V (1588) in which he expressed the Church's *detestatio criminis abortus* and punished it with excommunication.

France in the person of Ambroise Paré had begun to progress in midwifery even before Italy. But in England the Art of Obstetrics was neglected. There was no

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CON PRIVILEGIO.
IN VENETIA,
Appresso Gio. Battista Cioti. M D XCVI.

Title-page of the first edition (1596) of Scipione Mercurio's *La Comare*. The author's name is here printed "Scipione Mercuri," but in the title-pages of the second and third books (dated 1595) "Scipione Mercurio."

original work on midwifery in the English language; only translations of Rhodion, Guillemeau, and Paré were available.

The ordinary practice of midwifery was in the hands of midwives, who, although practising as specialists since the dawn of history, had failed to develop the science or advance the art or dignity of their calling. They were mostly recruited from an uneducated class, and their characters were not beyond reproach. Harvey's friend, Percivall Willughby, gives many instances of their shortcomings and misdeeds. They were bitterly opposed to the doctors, who were only called in to difficult and operative cases, which were often rendered fatal by the ignorance and brutality of the midwives. The doctors, on the other hand, having little experience of normal cases, were apt to intervene too soon, especially when instruments, hooks and (later) forceps, were employed.

Only in France, where the modern development of midwifery began, had midwives attained any considerable position. In 1598 the first of the great French midwives, Louise Bourgeois, obtained her diploma. She was the first to describe prolapse of the umbilical cord, face presentation and its treatment, and expression of the placenta. She attended in her confinements Marie de Medicis, wife of Henry IV and mother of Henrietta Maria, the wife of Charles I, to whom Harvey makes many references in his work *De Generatione Animalium*.

The grievous practices of many of the midwives in England are related in great detail by Willughby; but he gives a testimonial in favour of the practice in London, where "the young midwives be trained seven years first under the old midwives before they be allowed to practice for themselves." In 1616 Peter Chamberlen II made a petition to King James that some order might be settled by the State for the instruction and civil government of midwives; but nearly three hundred years were to elapse before the desirable result was obtained through the persistent efforts of the Obstetrical Society of London (Midwives Act, 1902).

In England the position of midwifery was degraded and the study of anatomy was in an inactive state when Harvey went to Padua, where both subjects were being assiduously studied. The obstetrical and gynaecological writings of ancient and modern authors had just been published in the *Gynaecia*; the circulation of the blood, "the greatest physiological discovery of all times," was as yet unknown; the compound microscope had not been invented, and thus neither the ovum nor the spermatozoon could be seen. The ovary was still called the testis muliebris, but the ovarian follicles, although observed by Spigelius, were not well known till De Graaf published his observations in 1672, and the spermatozoon was discovered in 1675 by a medical student, Louis Ham, a pupil of Leeuwenhoek's, who published the observation in the *Philosophical Transactions*, in 1677. Thus, when Harvey wrote his book on the generation of animals he was dependent on naked-eye observations and experiment. In the preface to that book Harvey approves the opinion of Aristotle as to the necessity for observation and personal experience. He wrote:

"No man can be truly called *prudent* or *knowing* who doth not by his own experience followed by manifold remembrance, frequent sensation and diligent observation know these things to be so. For without that we think only, or believe, and such knowledge as that is to be reputed other men's rather than our own. Wherefore fond and erroneous is that method of seeking truth in use in our times; while most men diligently enquire not what the truth is, but what other men say it is; and inferring universal conclusions from particular premisses and thence shaping to themselves irrational deductions they transmit to us things like truth for truth itself.

"Hence it is that sophisters and half-knowing men, polling other men's inventions saucily impose them upon us for their own (shifting only the phrase and order and adding some impertinences of their own), and render Philosophy (which ought to be clear and perspicuous) obscure, intricate and confused. For whoever they be that read authors and do not by the aid of their own Senses abstract true representation of the things themselves (comprehended in the author's expressions) they do not resent true *Ideas*, but deceitful *Idols* and *Phantasms* by which means they frame to themselves certain *shadows* and *Chimaeras*, and all their theory and contemplation (which they count *Science*) represent nothing but *waking men's dreams* and *sick men's phrensies*."

Harvey had a great admiration for the ancient writers, but said that only the ignorant will grant that they had "engrossed the whole truth." He had little faith in "bookwrights, who conceive it plentifull satisfaction of minde to them that they finde it in Books and have their memories well loaded with sage sentences; for they that are thus philosophers *ex traduce*, by descent and derivation, are just as wise as their libraries." He appealed to observation of Nature and experiment. His statement, "Nature herself must be our adviser; the path she chalks must be our walk," is an indication of the course he followed in his chapter on labour.

Caesarean section. From the first edition (1596) of Scipione Mercurio's *La Comare*. The incision is made to the right of the middle line, in order to avoid the spleen

THE EMBRYOLOGICAL, GYNAECOLOGICAL, AND OBSTETRICAL WORK OF HARVEY.

Harvey was engaged during many years in almost daily observation and dissection of eggs and the uterus and embryo of animals and man. The results of his patient researches added greatly to our knowledge, and justify the remark of Frederick Ruysch that Harvey, "who is to be considered amongst the greatest of true philosophers," advanced the history of generation by his personal observations more than his predecessors by their united labours.

One pregnant generalization, "ex ovo omnia" or "omnia animalia ex ovo," resulting from his researches is placed in the forefront of his *De Generatione Animalium*, and it is, to use a favourite expression of Harvey, "strange" that a distinguished writer should have failed to find the aphorism in the work, since "ex ovo omnia" appears on the remarkable frontispiece, here reproduced, of the Latin edition published in London (with illustrations of the "animalia"), and on the second page appears the statement "omnia animalia . . . ex ovo." The mistake was probably due to the writer's having read one of the Amsterdam editions in which the plate does not bear the legend.

Harvey was a supporter of the doctrine of epigenesis, as opposed to preformation of the embryo, and although he failed to discover the true nature of the ovum and regarded the uterus itself as an "exposed ovum," yet he is to be numbered amongst the "ovists" as opposed to the "animalculists," who were misled by incorrect observation with the compound microscope, while Harvey formed a correct judgement based on accurate observations with the naked eye. Harvey had only the aid of a simple lens ("perspective") to aid him in observing the minute changes occurring in the early stages of development; but the care he took is remarkable. He would place his specimens in water in a silver basin (no doubt to get reflected light), and took care to arrange for brilliant illumination of the

object, as, for example, in his observation of the *punctum saliens*.

"If you are desirous to make discovery of this observation towards the declining of the third day, you may, if you be extremely intent, by the assistance of a clear and *great light*, or by the *Sun beams*, or a *Perspective*, make a shift to discerne it. For else this purple streak is so exceedingly nice, and fine, and the motion of the *Punctum saliens* is so imperceptible, that you will only loose your labour."

Harvey was the first to locate the origin of the embryo in the "cicatricula," and refuted Fabricius's opinion as to its origin in the chalazae, the function of which as ligaments for the yolk Harvey was the first to discern. He showed by many direct observations and convincing arguments that the chalazae had nothing to do with the embryo, and casts a little ridicule on his master Fabricius's view in the words, "How improbable a thing is it that every egg should have two seeds or rudiments for the constitution of only one chicken."

The bulk of Harvey's *De Generatione Animalium* is made up of his careful observations and descriptions of the development of the ovum and foetus in all stages in birds, animals, and man. He made many dissections of human embryos, "from the big-ness of a tadpole and so upwards to the birth." He calls attention to the great changes which take place in the second, third, and fourth months. He had often dissected the human ovum in the second month. It was of the size of a pheasant's egg; sometimes he found a foetus, at others none. The foetus was of the length of the nail of the little finger, but the shape was like a little frog save only that the head was great and the legs extremely short; just like the tadpoles in June. "The face was like that of other animals, as of a dog or cat without lips, and a wide mouth from one ear to the other."

His description of the foetus and its viscera at various ages commands our warmest admiration, both for its accuracy and happy illustration; thus of the foetus at the third month he writes, "the substance of the heart was most white, having two ventricles of equal magnitude and thickness and a double *cone* like two twin-kernels of a nut; the liver was wondrous little and also white. All this time, namely, for three months, scarce anything of the after-burden is to be seen." He points out how the head at first outstrips the body in bulk, but afterwards is very much short of it, and that "the like disparity is between the body and the limbs, so that at the second month his arms are so short that if you stretch out his fingers to their furthest extent they will not be able to touch one another and his thighs are so short that being inflected upon his abdomen they will hardly reach to his navel." In newborn children the bulk of the body is a pretty deal larger, he says, than that of the limbs until they are able to stand and go, "but go upright they cannot till the prolixity of their legs and thighs exceeds the longitude of the rest of the body. And hence is it that their first venture to foot it represents them a prone kind of cattell which can scarce exalt themselves to the erection of a cock."

Harvey made a discovery of the highest medico-legal importance when he observed that the lungs of foetuses which had breathed "stretched and dilated by the air put on a whiter colour, and by this observation of the different complexion you may discover whether a mother brought her child alive or dead into the world; for instantly after inspiration the lungs change colour, which colour remains, though the foetus die immediately after."

The great and original merit of Harvey's work on generation lies in the careful and methodical observation and record of the embryo and foetus at all stages. Harvey did for development what the illustrious Paduan professor, Malpighi, subsequently did for disease in his *De sedibus et causis morborum* (1761).

When Harvey came to consider the *causa causans* of generation he confessed he was "at a stand." It was a "dark, obscure business" about which "authors do nowhere more cavil and contend." Having failed, owing to the non-existence of the compound microscope, to discover the ovum or the spermatozoon, and having convinced himself by many observations and experiments that no part of the male seed entered the uterus, "and yet there is a necessity that something should be there which may render the female fruitful," he had no refuge left but to apprehend that the woman was impregnated by the conception of a general immaterial idea, "that the same thing is effected in the womb as in the braine, unless," he adds "some cunning Philosopher whom the gods have better provided for can finde out some efficient cause which is not included in our recapitulation." Atoms, contagion, effluvia, odours, incorporeal spirits, had all been cited as the efficient cause: Harvey pleads for a place for his conjecture, which he offers "in a problematical way," until there be some certainty established in the business. "Let the learned and ingenious stock of men consider it; let the supercilious reject it; and for the scoffing ticklish generation, let them laugh their swinge."

The whole of the work on the development of the foetus is a testimony to his great powers of observation and reasoning, and justifies Sir Thomas Browne's description of Harvey as an "ocular philosopher and singular discloser of truth," and his work as "that excellent discourse of generation so strongly erected upon the two great pillars of truth, experience and solid reason."

To gynaecology, which in his time was in an embryonic state of development, Harvey made several notable contributions. He gives a good description of the broad ligament of the uterus—"the pendulous band or tie," he calls it; mentions the Hottentot apron of which he received information from a surgical friend, "an honest man": this he likens to the "vail" in animals. He describes the green sickness in virgins "whose womb is slender and their terms are at a stay"; he had seen ectopic gestation; alludes to the displacements of the womb; and is doubtful as to the agitation of the womb in hysteria. He gives a good account of spurious pregnancy and mentions an instance in a noble matron, whom in spite of all the arguments he could suggest, he was unable to persuade that she was mistaken; this shows considerable experience and confidence in diagnosis.

Harvey applied his knowledge of the circulation of the blood to surgery, pointed out how by tying the artery going to a tumour the tumour could be removed with safety, and thus laid the scientific foundation for the extensive operations, such as hysterectomy, now performed by the same method (isolated ligation of vessels instead of ligation *en masse*), a lesson not yet learned by all gynaecologists at the present day.

For the treatment of intrauterine diseases Harvey invented a dilator, after which he used injections, and by this means cured patients suffering from offensive discharges and from sterility.

Harvey discovered a peculiar bleeding tumour of the uterus which he called the "honey-comb"; for the mention of it we are indebted to the *Observations in Midwifery* of his friend, Dr. Percivall Willughby. When we recall that we owe to Ent the publication of the *De Generatione Animalium*, we can only surmise how many other observations of Harvey's were contained in his lost *Medicinal Observations* to which Harvey often refers. Willughby writes:

"There came into my house, at Darby, my honoured good friend, Dr. Harvey, 1642.

"Wee were talking of severall infirmities incident to the womb.

"After that I had related the aforegoing story de caudâ mulieris, and how shee flouded and was cured, hee added to my knowledge an infirmity, which hee had seen in women, and hee gave it the name of a honey-comb, which also, hee said, would cause flouding in women."

No further details are given; but the appellation "honey-comb" suggests that the growth had holes in it discharging thick fluid; so far as I know, the only condition of the cervix corresponding with this description is a very rare form of cancer, an instance of which has been published, with illustration, in the Lettsomian Lectures for 1920. Percivall Willughby was at the time of Harvey's visit 66 years of age, and was well acquainted with the ordinary forms of cancer, of which he records many observations. It is interesting, therefore, to find that Harvey should be able to add to the knowledge of this experienced gynaecologist an undescribed disease, the "honey-comb."

Harvey's chapter on labour (*De Partu*) is the first original English work on midwifery, and justifies Aveling's designation of Harvey as the Father of British Midwifery. The scientific part consists of criticism of previous opinions on the anatomy and physiology of the foetus and of parturition based on his own observations; the practical part

gives evidence of extensive personal experience in midwifery and is in the main devoted to the recommendation of patient watchfulness and gentleness, imitating nature, in ordinary cases, with resort to podalic version in difficult ones.

Harvey was the first to describe accurately the foetal circulation and the great development of vessels in the pregnant uterus. He also had observed, as had Ambroise Paré before him, the softening and loosening of the sacro-iliac and pubic articulations before labour.

He gives a careful description of the lie and posture of the foetus in utero, states that it executes the somersault ("dives down") a little before labour, and that it sometimes changes its presentation from time to time.

"For he swimmeth in a water and moveth himself to and fro, he stretcheth himself now this way, and now that, and so is variously inflected and tumbled up and down, in so much that sometimes, being entangled in his own navel-string, he is strangely ensnared"; "and the Great-bellied women know full well that he doth sometimes acquire a different scituation when they find the Child kick sometimes above, sometimes below and now on this side and at other times on that."

Harvey alludes to cases in which the foetus is born completely enclosed in the unruptured membranes, and cases of adherent placenta "oftentimes hardly divided from the uterus which doth induce evil symptoms, noisome smells, and sometimes gangreen whereby the mother is brought into imminent danger."

With regard to the duration of pregnancy Harvey gives the usual ten lunar months. He quotes Franciscus Valesius's case of the survival of a five-months' girl and another case of a woman who bore a living child after a gestation lasting sixteen months. "But I confess," says Harvey, "these are rare accidents." "It must not be denied that there are many crafty and fraudulent women which for lucre sake, or for fear of punishment or infamy, will feign and swear they are with child. And likewise it is well known that others are easily deceived and do conceive themselves to be with child when it is no such thing." And a super-foetation may cause the duration of pregnancy to be apparently longer than it is in fact.

Harvey shared the opinion of Hippocrates that the birth of the child was due in the main to its own efforts, and here is at variance with Fabricius, who ascribed the work to the uterus, the muscles of the abdomen, and the diaphragm. Harvey admits, however, that the uterus has its share in the business, and gives details of a case of labour in a procident uterus as a proof, and states that an unnatural birth sometimes results from failure of the mother in her expulsive office (uterine inertia).

Harvey shows his extensive experience by mentioning rare cases in his own practice, such as ectopic gestation, the passage of by-waters (hydrorrhoea) without premature labour ensuing, which "he had often seen," the survival of the infant which had been delivered by Caesarean section several hours after the death of the mother, the child sucking the finger while still in the passage (? face presentation), the successful delivery of an unconscious woman (? eclampsia) by irritation of the nares; the removal of a putrid "false conception" (? sloughing fibroid) after delivery; the vagitus uterinus, etc.

Harvey has a special chapter on the membranes and humours of the uterus. With regard to the chorion, he points out the error of Fabricius in stating that the urine of the foetus was passed through the allantois into the chorion and that the amnion contained the sweat of the foetus, and asks if his master had ever seen such a creature as a sweating chicken. His own opinion was that the liquor amnii served as food for the foetus. He based upon the opening of the mouth of the foetus seen through the membranes, the fact that the child will suck the finger while still stuck fast in the birth and the way in which a newborn child sucks "as if he would devour the nipple; he still draws it into his mouth and by the aid of his tongue and palate he sucks the milk as if he chewed it, with farre more earnestness and delight than a grown body. Wherefore he seems to be good at it of old and to have practised it in the womb."

Harvey showed, as Aranzius had done, that there was no communication between the vessels of the foetus and the mother; the placenta "served to concoct or digest the alible nutriment which proceedeth from the parent to support the foetus"; perhaps Harvey here anticipated the discovery of the function of the syncytium.

In considering the practical side of Harvey's work in obstetrics we are handicapped by the unfortunate loss of his *Medicinal Observations*. In the management of ordinary labour he advocates patience and gentleness in imitation of Nature, which "is a perfect operatrix"; "if you carefully ponder Nature's works you shall find none of them made in vain, but all directed to some end and some good." He especially rebukes

"the younger more giddy and officious midwives who, lest they should seem unskilful at their trade, do mightily bestirre themselves and provoke the expulsive faculty by medicinal potions whereby they rather retard and pervert it and make it an unnatural and difficult delivery and vainly persuading the women to their three-legged stoole weary them out and bring them in danger of their lives. It is much happier with poor women, and those that dare not own their great bellies where the midwives help is never required, for the longer they retain and retard the Birth the easier and more successful proves the delivery."

The birth in breech presentation is slow and painful,

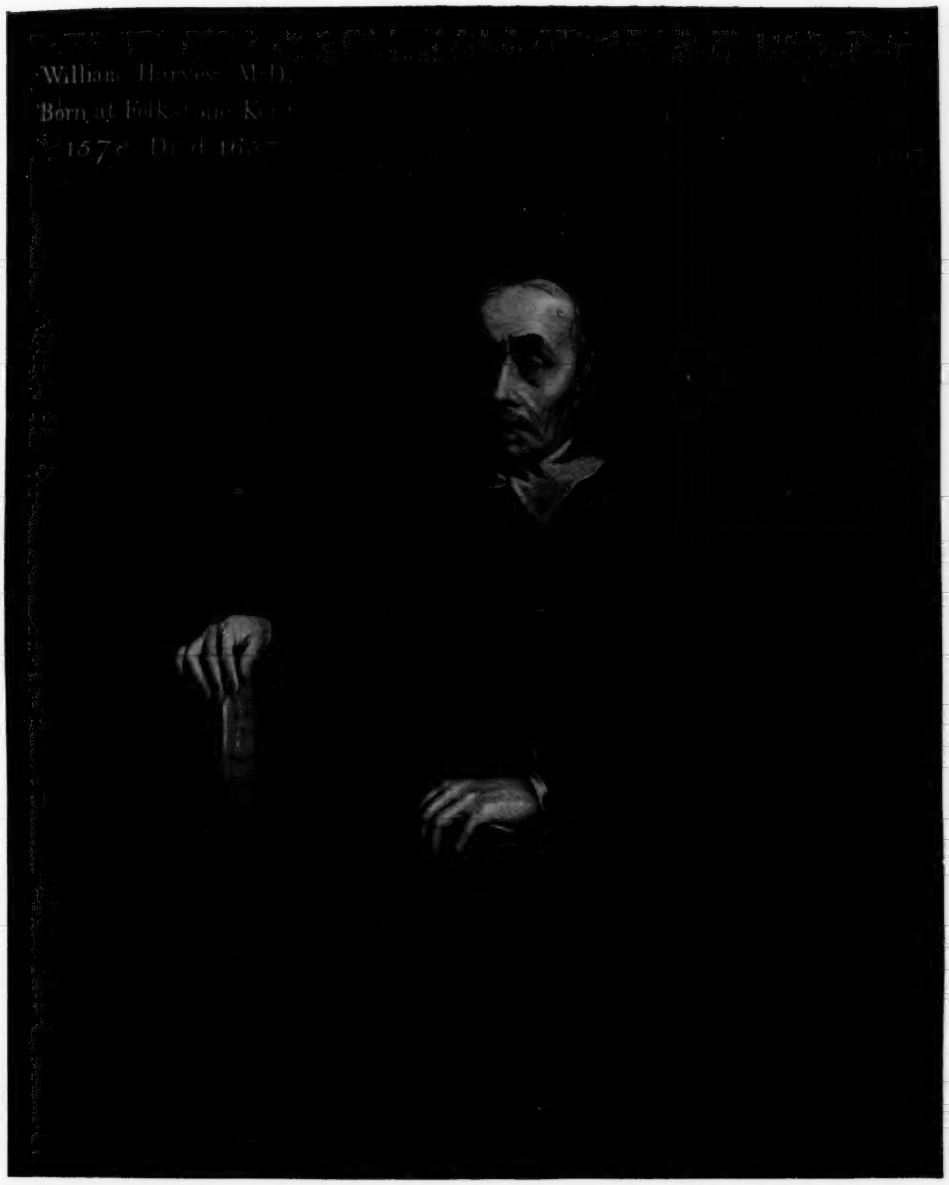
"and yet notwithstanding in abortment, and where the foetus is dead or that there would be a hard delivery any other way, so that there is necessity of handiwork in the business the more convenient way of comming forth is with the feet forward; for by that means the straights of the uterus are opened as it were by a wedge."

An excellent description is given of the contraction of the uterus after labour, of the after-pains, of the condition of the os as indicative of the state of the contents, of the powerful contraction of the uterus resulting frum stimulant injections, and the state of the lochia as a guide to treatment. He points out that if any clotted blood or any other preternatural matter remains in the cavity of the womb after delivery, the womb will neither retire upwards nor close its orifice, but its neck will continue soft and open, and mentions a case where, guided by this experience, he successfully removed an "almost gristly substance" (apparently a sloughing fibroid) as big as a goose's egg from a puerperal patient suffering from fever, a disordered pulse, and a cold sweat, "as if she were a-dying."

He gives a careful description of the involution of the uterus after delivery and of the lochial discharge. "It is indeed a wonderful thing that the so vast bulk of the uterus should so much lessen in so short a space—namely, in the space of fifteen or twenty days." This is a more accurate statement of the period during which the uterus is palpable in the abdomen after delivery than that given by many modern textbooks.

Fortunately we are able to judge of the high esteem in which Harvey was held as an obstetric physician by the writing of his contemporary Percivall Willughby (1596–1685), who was the son of Sir Percival Willughby of Wollaton Hall, Nottinghamshire, and uncle of Francis Willughby the naturalist. He was educated at Tunbridge, Rugby, Eton, and Oxford, graduated B.A. on July 6th, 1621, and was admitted an extra Licentiate of the College of Physicians on February 20th, 1640. He practised in Derby from 1631 to 1655, when he removed to London for the better education of his children, returning in 1660 to Derby where (except for a short interval at Stafford) he practised till his death at the age of 89. He acquired a great reputation in midwifery throughout Derby and the neighbourhood, and wrote *Observations in Midwifery* and *The Country Midwife's Opusculum*,* which were first published in one volume in 1863, by H. Blenkinsop at Warwick, from a manuscript then in his possession, and now in the Library of the Royal Society of Medicine. In this work, which gives the best contemporary account of midwifery in England, Willughby quotes his honoured friend Dr. Harvey on no less than sixteen occasions, attributes all his knowledge to him, and recommends his work in the following words, with which I will conclude: "I know none but Dr. Harvey's directions and method, the which I wish all midwives to observe and follow, and oft to read over and over again; and, in so doing, they will better observe, understand, and remember the sayings and doings of that most worthy, good and learned Dr., whose memory ought to bee had for ever in great esteem with midwives and child-bearing women."

* A Dutch translation of the *Opusculum* was published in 1642 at Leyden.


William Harvey M.D.
Born at Folkstone Kent
157[illegible] Died 165[illegible]

THE PHYSIOLOGICAL COST OF MUSCULAR WORK:

A REPLY TO OBJECTIONS.

BY

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In articles published in the British Medical Journal of May 21st, 1921, p. 733, by Leonard Hill and J. A. Campbell, and of July 9th, p. 39, by J. B. Orr and J. P. Kinloch, objections have been raised to the validity of the method by which Waller and De Decker have arrived at a preliminary estimate of the physiological cost of various kinds of industrial work, of which a summary was published in this journal on May 7th.

These objections are not new to us, and have, indeed, already been dealt with by one of us in Dr. Waller's first interim report to the Food (War) Committee of the Royal Society,[1] and a reference to that paper might serve as a sufficient answer to them. That report, which took origin from an agreement that "Waller's method by which determinations of CO_2 alone are made at short frequent intervals, was to be taken on trial," dealt at length with all of the objections now raised *de novo* in their unaltered form without any reference to the fact that they were then, as we believe, completely met and disposed of. But inasmuch as they have not been discussed at all in this journal, and as our further experience of the method has confirmed our forecast of its utility, we are unwilling to let the opportunity pass of making a direct reply to the objections. A final and in itself sufficient reason for doing so consists in our belief, confirmed now by more than two years' experience, that by this method, as by no other, further knowledge is to be obtained regarding a primary factor in industrial life—namely, a knowledge of the physiological cost of various kinds of industrial work measured during its actual performance in the workshop and at the ship's side, in the factory, and on the road. If our belief is wrong, we have merely wasted a couple of years of our time, and all that matters is that other people's time should not be similarly wasted. But if we are right, it is important that many other people should add their endeavours to ours in the application of our method of observation.

Briefly stated, the method consists in measuring and recording the ordinate of CO_2 discharge during the working day by taking its percentage in small samples (10 to 20 litres) collected at convenient intervals during the working day with least possible interruption of the work in progress. Obviously there is nothing new in such a method; the only novelty consists in its practical application and in the subsequent translation of the CO_2 data into their equivalent calories, so as to establish comparison between our results and those of other observers for such forms of exercise to which more elaborate methods can be applied. And we take walking at moderate speed on a horizontal path as the form of exercise that most readily affords comparative data by different methods.

The objections, as stated by Hill and Campbell, and by Orr and Kinloch, are three in number:

First Objection: *The period (half a minute) during which our samples of expired air are taken has been too short.*

Obviously we should have preferred longer periods if such had been practicable, since on short periods the error of volume by turning the tap on and off at different phases of respiration can be very serious, and at the outset we thought it would hardly be possible to make use of half-minute samples. But after trial, and especially in cases where ventilation (during work) has high values (30 and 40 litres a minute), we found that the half-minute samples were sufficient and necessary; we learned from our first observations on dock labourers that during a three minutes rest the ordinate fell to nearly half its work value.[2] For normal ventilation we always take longer samples—that is, for one or two minutes or 100 seconds.

Short samples do not unduly tax the patience of the worker nor cause him to lose time. Interruptions of work for four minutes would usually be quite impracticable; nor would it be convenient to fit him with a large bag and face-piece to collect 80 or 100 litres of his expired air. We have to use a small (20 to 30 litre) bag with a mouth-piece and a nose clip that do not require laborious adjustment. We did as a matter of fact expressly state that the error of volume inherent in short sampling might be of a serious order, but by repeated trial we became convinced that the error is less serious than we had anticipated before trial. Moreover, the serious error in any single reading is reduced to insignificance when the final result is averaged from many readings. Obviously a first sample collected from an unaccustomed subject, if found to be of markedly deficient volume, is to be rejected; it means that the subject has failed to breathe naturally into the bag.

The numbers quoted by Hill and Campbell for their unaccustomed subject, "J. A. C.," on April 1st (Table I)—namely, 1.3, 2.1, 4.1 c.cm. CO_2 per second (resting values) are evidently wrong; unfortunately the volume of ventilation and percentage of CO_2 are not stated, but, as is shown by their low probable caloric value as calculated from oxygen, it is clear that they took an incomplete sample. On April 4th, on the now accustomed subject, they get the more reasonable-looking figures—3.8, 3.7, 3.3 c.cm. CO_2 per second. Nevertheless, they bring their previous trio of absurd numbers in evidence of the unreliability of our method. We cannot admit the validity of such criticism.

The figures given by Hill and Campbell in Table II are a little more satisfactory. They show, on careful inspection, what, indeed, might be taken for granted *a priori*—that half-minute samples vary more than do four-minute samples; but they afford no means of comparing the two sets of figures to a common scale. We have been at some pains to do this, on the assumption that their heat figures were taken on a normal subject with a skin area of 1.75 square metres. These figures show far more clearly than do the original figures the actual extent to which the CO_2 figures diverge from the caloric figures of Hill and Campbell.

Data given by Hill and Campbell.				Kilo-calories per hour as calculated by us from the data.		
	Hour of Work.	Heat cost in milli-calories per cm^2.	CO_2 in c.cm. per sec.	Theirs (from the heat data).	Ours (from the CO_2 data).	Differ-ence.
April 25th.						
Half-minute samples	2nd	5.8	17.7	365	354	−11
	3rd	6.3	19.2	397	384	−13
	4th	5.4	16.4	340	328	−12
Four-minute samples	2nd	4.6	12.7	290	254	−36
	3rd	—	11.0	—	220	—
	4th	4.2	11.2	264	224	−40
May 4th.						
Half-minute samples	2nd	3.3	8.3	208	166	−42
	4th	4.8	12.7	302	254	−48
Four-minute samples	2nd	5.1	13.6	321	272	−49
	4th	4.9	13.2	309	264	−45

The differences in the individual results of the two methods of calculation are here considerable, but hardly as great as might have been anticipated from the data as given by Hill and Campbell; they do not give the area of J. A. C., and we have therefore had to assume it of an average value of 1.75 M^2. The authors' heat figures, which are given in millicalories per square centimetre, represent single observations taken chiefly in the second and fourth hours of work, and the range of error in single observations of the kind is considerable, even in the hands of the most skilled observer. The observations are too few and too unsystematic to allow of averaging.

Second Objection: *We (W. and De D.) have failed to place sufficient emphasis on the influence of food.*

As a matter of fact, we took no account at all of the small variations of metabolism due to the influence of food, but regarded them as negligible in comparison with the increased metabolism occasioned by muscular work. From our own observations, as well as from those of many

previous observers, we reckoned that the post-prandial increase of CO_2 might amount to one-fifth of the resting value, whereas the increase by moderate muscular work amounts to at least five times the resting value. We considered that it would be very hazardous to make any attempt to detect, far less take account of, the varying influence of food. Our neglect of this factor was, moreover, justified by the conclusion arrived at by Benedict and Murschhausen[3] to the effect that "the increment (of energy discharge) due to the work of forward progression was constant, irrespective of whether the subject was with or without food." And we were concerned with measurements of CO_2 output of labourers under their normal conditions of life.

Third Objection: *We (W. and De D.) have neglected the significance of the respiratory quotient (R.Q.) in determining the caloric equivalent of the volume of CO_2 exhaled.*

This objection, which was dealt with at length in Dr. Waller's first report cited above, is, of course, fundamental and theoretically the most important of the three, since it strikes at the root of the short method by CO_2 alone, and claims for the long method that it is the sole and only means of ascertaining the cost of work in terms of calories per unit of time and body surface.

We demur to this exclusive claim made on behalf of the longer method represented as valid, as against the shorter method represented as invalid. In our opinion, the apparent accuracy of the long method must be reduced by the notorious difficulties of reading and calculation, while the apparent inaccuracy of the short method is reduced by the facility with which relatively large numbers of observations can be made and worked out on the spot.

As stated by Dr. Waller two years ago, in his first communication on the matter to the Physiological Society in December, 1918, both methods have their proper uses—as a "low-power method" and as a "high-power method" respectively—the former being best adapted for use in the factory and on the road for the necessary preliminary survey on an extensive field, the latter for the closer determination of particular points in the laboratory. We have, of course, considered and studied very carefully the range of error incurred by disregarding the fluctuations of the caloric value of CO_2 which accompany possible fluctuations of the respiratory quotient during observation, and the adoption of a fixed factor for the calculation of the caloric value of observed CO_2.

We used in the first instance a factor calculated upon a mean R.Q. = 0.85 and a temperature difference of 14° between air as expired and as analysed, which gave the following simple equivalence:

(1) 1 c.cm. CO_2 per second = 20 kilocalories per hour. We still use this equation for summary comparison of data on the two scales, but we now prefer to use as a simpler and more generally intelligible figure the equivalence:
(2) 1 c.cm. CO_2 = 5 calories, whereby the R.Q. is taken = 1 and the corresponding value of CO_2 rounded from the tabular value 5.047, as originally given by Zuntz (*Pflüger's Archiv*, vol. lxviii, 1897, p. 201).

Orr and Kinloch give the following figures to show the extent of error that may occur when caloric values are calculated from CO_2 alone. Their subject was marching at a rate of 100 yards per minute.

Data and Calculations by Orr and Kinloch.

1919.	CO_2 per min.	O_2 per min.	R.Q.	Calories calculated from O_2 and R.Q.	Calories calculated from CO_2. R.Q. assumed at 0.85.
Jan. 8 ...	743	989	0.75	4.69	(4.36)
Jan. 9 ...	865	960	0.90	4.73	(5.07)
Difference...				0.04	0.71

This is an extreme case, selected by Orr and Kinloch to show the extent of error incurred by the short method as compared with the accuracy afforded by the long method. Our critics ought to have taken as their illustration a group of several observations as homogeneous as might be, and have then worked out the comparative figures afforded, with and without the O_2 readings taken into account, when, if we are not mistaken, they would have realized that the short method data do not compare unfavourably with long method data, but rather the contrary. Taking, for example, as a fair group of cases their own data for the subject M. marching at the speed of 100 yards per minute, as given in Table L on page 45 of their report on the Energy Expenditure of the Infantry Recruit in Training, we have the following figures; the total number of observations (7) is too small to allow of strict statistical inference; it is, however, the largest group number we can find in that publication.

Data by Cathcart and Orr (loc. cit., p. 45).

O_2.	CO_2.	R.Q.	Calories per Hour.	
			Calculated from CO_2 and O_2.	Calculated from CO_2 alone.
1,305	1,057	81	376.8	352.3
1,322	1,004	76	376.8	334.7
1,131	995	88	332.4	331.7
1,053	947	90	310.8	315.7
1,137	1,012	89	334.8	337.3
1,104	949	86	322.8	316.3
1,178	989	84	342.6	329.3
Arithmetic mean			342.4	331.0
Standard deviation			23.62	11.71
Probable error			15.9	7.9
Coefficient of variation			6.900	3.540

The results in calories per hour by the long method are here given as calculated by Cathcart and Orr in accordance with the R.Q.; those by the short method have been reckoned by us on the assumptions that only CO_2 figures were available and that 1 c.cm. CO_2 per second was equivalent to 20 calories per hour. As will be seen, the arithmetic mean obtained by the short method is only 11.4 ± 6.72 calories below that by the long method—that is, the difference is not significant. Further—and this certainly gives us some surprise—the probable error and the coefficient of variation for this particular group of observations comes out with oxygen about twice as high as without. The measurement of oxygen has evidently introduced an additional error of observation.

But this can be an accident, and all that we may claim from the two columns of figures is that the short method requires to be taken into serious consideration.

The best evidence of the validity of the short method has been afforded by its results—by those more especially that are obtained from measured amounts of work on the staircase and on the horizontal path. We insist upon the latter because it is the most universally practicable, and because it affords the readiest possible means of demonstration as well as the necessary bridging measurement from cost of known to cost of unknown work. We do not desire to overload this communication with tables of data, and shall therefore content ourselves with the following detailed account of a single observation made for the purposes of demonstration at the Institut Marey upon two French soldiers walking together at a remarkably uniform speed round a circular horizontal track of three laps to the kilometre (see table and chart, p. 629).

We have found it useful, for reasons that are self-evident, to carry out such observations upon two subjects walking together at the same pace.

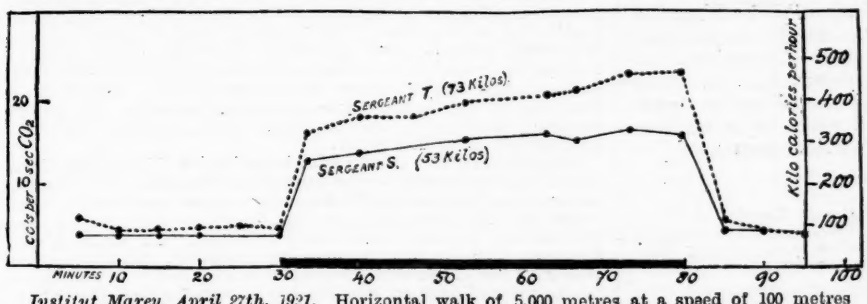
Orr and Kinloch insist very properly upon the spurious fluctuations of the respiratory quotient that take place at the beginning and end of a period of work, and on the necessity of disregarding fluctuations of the respiratory quotient caused by pumping out or retention of CO_2. They go on to say:

"It is obvious that in the method of estimating the cost of work from the CO_2 exhalation, results at the beginning of work or immediately after the work stops are of little value. In the

Institut Marey, April 27th, 1921. Sergeants S. (53 kilos) and T. (73 kilos) walking together round a circular track of 3 laps per kilometre, S. setting the pace; no load. They walked at a regular speed of 100 metres per minute (= 3¾ miles per hour), and covered 15 laps (5,000 metres) in 50 minutes. Samples of expired air were collected for 30 seconds over the last 50 metres of the 1st, 3rd, 7th, 10th, 11th, 13th, and 15th laps.

	Time of Lap.	Time of Sample.	Sergeant S.			Sergeant T.		
			Volume of Sample in Litres.	CO_2 per 100.	CO_2 in c.cm. per second.	Volume of Sample in Litres.	CO_2 per 100.	CO_2 in c.cm. per second.
At rest (sitting).								
End of 5th min. ...		60″	9.0	2.5	*3.75*	12.0	3.0	*6.0*
10th ,, ...		60″	9.0	2.5	*3.75*	9.0	3.0	*4.5*
15th ,, ...		60″	9.0	2.5	*3.75*	9.0	2.5	*4.5*
20th ,, ...		60″	9.0	2.5	*3.75*	12.0	2.5	*5.0*
30th ,, ...		60″	9.0	2.5	*3.75*	9.0	2.5	*4.5*
Walking.								
At end of Lap 1 ...	3′ 40″	30″	11.0	3.5	*12.8*	16.0	3.0	*16.0*
,, ,, 2 ...	3′ 35″	—	—	—	—	—	—	—
,, ,, 3 ...	3′ 34″	32″	11.0	4.0	*13.8*	18.0	3.5	*18.0*
,, ,, 4 ...	3′ 34″	—	—	—	—	—	—	—
,, ,, 5 ...	—	30″	—	—	—	15.5	3.5	*18.0*
,, ,, 6 ...	—	—	—	—	—	—	—	—
,, ,, 7 ...	3′ 34″	33″	11.5	4.0	*15.3*	15.0	4.0	*20.0*
,, ,, 8 ...	—	—	—	—	—	—	—	—
,, ,, 9 ...	—	—	—	—	—	—	—	—
,, ,, 10 ...	3′ 32″	30″	12.0	4.0	*16.0*	15.5	4.0	*20.7*
,, ,, 11 ...	—	30″	11.5	4.0	*15.3*	16.0	4.0	*21.4*
,, ,, 12 ...	—	—	—	—	—	—	—	—
,, ,, 13 ...	3′ 33″	30″	12.5	4.0	*16.7*	17.5	4.0	*23.3*
,, ,, 14 ...	—	—	—	—	—	—	—	—
,, ,, 15 ...	3′ 33″	30″	12 0	4.0	*16.0*	18.0	3 9	*23.4*
At rest (sitting).								
End of 5th min. ...		60″	9.0	3.0	*4.5*	10.0	3.5	*5.8*
10th ,, ...		60″	9.0	3.0	*4.5*	9.0	3.0	*4.5*
15th ,, ...		60″	—	—	—	8.0	3.0	*4.0*

	Sergt. S.	Sergt. T.
Average CO_2 during walking ...	*15.13*	*20.1*
Average (before walk) at rest ...	*3.75*	*4.9*
Average net cost of walking ...	*11.38*	*15.2*
Work of walking ...	88 33 KgM. (hor.)	121.7 KgM. (hor.)
Cost of walking per KgM. hor....	0.129 c.cm. CO_2	0.125 c.cm. CO_2
That is, at 5 calories per c.cm. CO_2	0.645 calories	0.625 calories



Institut Marey, April 27th, 1921. Horizontal walk of 5,000 metres at a speed of 100 metres per minute by Sergeants S. (53 kilos) and T. (73 kilos). The heavier man discharges the greater amount of CO_2. Both men are discharging at approximately the same rate per kilo per metre —namely, 0.129 and 0.125 c.cm. (100 metres = 109.3 yards.)

former case CO_2 is accumulating in the body, while in the latter it is washed out. In neither case is there any parallelism between the production of CO_2 in the tissues and the discharge of CO_2 by the mouth."

We are in complete accord with all of these warnings and have acted upon them from the outset of our observations. Spurious fluctuations of the respiratory quotient do not concern us at all, since in our method it is not taken into account. Effects of pumping and retention of CO_2 at the beginning and end of a spell of work are likewise left out of account by us, since we measure only the CO_2 ordinate when the constant régime of work is established.

A fourth and somewhat indefinite objection has been raised by Hill and Campbell, which, addressed as it is to matter of interpretation rather than to matter of fact, will ultimately require careful discussion after further investigation.

The matter of fact is that by our method we find regularly that the CO_2 ordinate taken at hourly intervals during several hours' work, exhibits a progressive increase towards a maximum (after several hours it exhibits a decline). The increase can of course in some instances be due to increase of work; the terminal decline is certainly due to decrease of work, and is in our view a sign of fatigue pushed to the degree of exhaustion. But in other cases where there has been no such speeding up—for example, in piecework and in military marching where the rate has been approximately constant or even declining, it must have been due to some other cause. We thought it might be due to a gradually developing insufficiency of ventilation entailing a gradually rising carbon dioxide tension throughout the system, or that it might be a sign of decreasing mechanical efficiency—that is, an early sign of muscular expenditure (objective fatigue).

But whatever the explanation may be, the fact itself is unquestionable, and cannot be disposed of by the statement that it has not previously been detected by other observers using other methods. We find the increasing ordinate on all classes of workers—on heavy workers in the docks and in cold storage, on less heavy workers in the casting-room and at the coal-face and on march; in least heavy workers, such as tailors and shoemakers. We can only repeat the tentative explanation given in Dr. Waller's first report:

"Between the two possible causes [of the gradually increasing CO_2 ordinate] (1) increase of work, (2) decrease of efficiency, I am inclined towards the second as the more probable. The root fact in fatigue is a consumption of material, presumably of carbohydrate, in first instance, also of fat and of protein; subjective fatigue is felt when a certain degree of waste has been incurred. Objective fatigue commences long before its subjective aspect is experienced; it begins indeed with the beginning of work, with increased metabolism, of which increased CO_2 is the indicator and measure, and in the progress of the expenditure there is no line of demarcation to be drawn between a state of freshness and a state of fatigue; these terms are statements of the subjective states associated with the filled and unfilled reservoir of fuel. Moreover, the progressive increase takes place with piecework where the work is of steady value."

Hill and Campbell object to our view in the following terms:

"It is well known that a fatigued or uncomfortable subject carries out a given amount of work at a greater cost than when normal, but it does not seem reasonable that the colliers and shoemakers under consideration are so unskilled and of such poor calibre as to show signs of fatigue after a couple of hours' constant work, when this work is of the degree specified."

Our critics do not seem to have formed any clear idea of the conditions under which our observations were carried out; the colliers and shoemakers under our observation were first-rate workmen; we never examined them for only a couple of hours, and they never exhibited any signs of "fatigue" as imagined by Hill and Campbell. They did, in fact, as do all kinds of workers, exhibit this progressive increase of the CO_2 ordinate (with which we observed in the cases of the colliers a progressive increase of pulse frequency). We may or may not be right in attributing the rise of cost to decreasing efficiency. We are in presence of a new fact, and are not yet satisfied with our own or any other explanation—least of all with that suggested by Hill and Campbell, to the effect that the progressive increase has been due to food. This suggestion is contradicted by our own experience, as well as by

the far more extensive and methodical experience of Benedict and Murchhausen, as quoted above.

Conclusion.

In conclusion, we wish to repeat and emphasize our opinion that the measurement of primary importance to our further knowledge of the physiological cost of industrial labour consists in the measurement of CO_2 expired during the day's work—recording the CO_2 values observed as ordinates throughout the day.

A fixed factor for an approximate conversion of CO_2 values into calories may be used in order to compare the findings by the short method with those of other observers by the long method. In cases where both methods are applicable we find that the results come out very close together.

In our opinion the most satisfactory and accessible test case is afforded by the cost of walking on a horizontal path at ordinary speeds—80 to 100 metres per minute (= 3 to 3¾ miles per hour). At 80 metres per minute we find by the short method that a subject "fit for military service" expends approximately 1/10 c.cm. CO_2 per second to carry 1 kilo of his body 1 metre horizontal—a finding that corresponds with that of other observers—for example, Benedict, of 0.5 calorie per horizontal kilogram metre.

As regards the relative (numerical) accuracy of the two methods, we should be very glad to find an opportunity of carrying out upon the same subjects simultaneous observations in parallel by the short and by the long method. We believe that it would be found that the relative accuracy of the two methods would prove to be very close by reason of the fact that the number of observations to be obtained is much greater by the short than by the long method.

The systematic measurement of the physiological cost of industrial work cannot be accomplished by the isolated effort of private enterprise; it requires the support of team work and the services of many industrious if not highly skilled professional researchers. The long method is impracticable without undue disturbance of the workman; indeed, no recent attempt has been made to apply it to "the determination of the energy output of men and women workers," or if such attempt has been made, the results have not been reported. The purpose of our observations of the last two years has been to show by actual trial at the docks, at the coal-face, and in the workshop that this physiological aspect of the industrial problem can be approached by a suitable method.

P.S., October 1st.—We are glad to learn that there is a prospect of carrying out for the Industrial Fatigue Research Board a parallel series of measurements by the long method and by the short method.

Our justification for taking the figure 0.85 as our standard value for the respiratory quotient consists in the experience of many previous observers (including ourselves), who have found that, apart from its spurious fluctuations, the true value varies very slightly from this mean value—thus, for example, in the series of observations given by Benedict and Murschhausen on p. 50 of their monograph on the *Energy Transformations during Horizontal Walking*, the average value of the respiratory quotient for the series of readings taken on four successive days—December 17th, 18th, 19th, and 20th—upon their subject, A. J. O., comes out at the identical value 0.8475 when the subject is standing at rest (twelve observations) and while he is walking at about 105 steps per minute (sixteen observations).

REFERENCES.

[1] *Proceedings*, 1919, B, vol. 91, p. 166. [2] Waller, Calibration of a Dock Labourer by means of his CO_2 Discharge, *Proceedings Physiological Society*, December 14th, 1918. [3] Energy Tranformations during Horizontal Walking, Carnegie Institution Report, No. 231, pp. 92–93.

THREE new cinematograph films have been produced by the New York State Department of Health, and are lent free of charge within the state; these films are entitled "Mouth hygiene," "Saving the eyes of youth," and "Swat the fly." The Health Department is now co-operating in the production of a film on water supply in farms; two reels are devoted to showing the rural resident how he can install a complete plumbing system in his house, and the difficult parts of the plumber's trade are shown in detail.

GLYCOSURIA OF MALARIAL ORIGIN.*

BY

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I WAS particularly interested to read the account of the two cases published by Dr. A. Castellani and Dr. J. G. Willmore in the BRITISH MEDICAL JOURNAL of August 20th, 1921. Recently Sir Charlton Briscoe asked me to investigate a case of glycosuria, and the conclusion was reached that the condition must have been due to malaria. On referring to several textbooks of medicine, no mention of glycosuria of malarial origin could be found. Castronuovo, however, regards malaria as important in the etiology of some cases of diabetes mellitus. (See *Medical Science*, iv, 6, 497, September, 1921.)

A Jewish merchant, aged 32, went to Bombay in 1919. In March, 1920, he was in bed for three weeks with "dysentery and colitis." He then went to Indore for further treatment and to convalesce. Whilst there he developed malaria. Parasites were found in his blood, but for three weeks only did he continue quinine treatment. The ague stopped, but he had a relapse a month later. During the following six months he had a series of relapses, but did not take any more quinine. In March, 1921, he sought professional advice on account of excessive thirst. He thought that he had lost about 7 lb., but did not consider that he had been passing an unusual amount of urine; he never had to rise at night to micturate. He had been much worried by his business. Sugar was found in his urine, and a diagnosis of diabetes mellitus was made. Carbohydrates were reduced; the glycosuria decreased considerably, but was still present when he left India in May, 1921. In June, after arrival in England, sugar was again discovered, but in July Sir Charlton Briscoe found no trace.

The patient stated that he had had a "mastoid abscess and glands" at 14; an operation for removal of adenoids at 16; scarlet fever at 18; and an operation for removal of nasal septum at 27 under a local anaesthetic. The operations were successful; no post-operative complications were noted. His father died at 45 of "creeping paralysis." His mother is alive and well, aged 61. He has one brother and two sisters, all very healthy. His maternal grandfather and maternal grandmother both died from "diabetes" at the age of 72 and 70 respectively.

The patient first saw me on June 28th, 1921. He had just recovered from another relapse of malaria, having had ague on June 23rd, 25th, and 27th at mid-day. I examined samples of blood and urine, and advised him to come into hospital for further investigation.

Blood.—Fairly large number of benign tertian malarial parasites present; haemoglobin 90 per cent.; red blood corpuscles not counted; white blood corpuscles 9,600, polymorphs 73.6 per cent., eosinophils 0.4 per cent., lymphocytes 24.4 per cent., large mononuclears 1.2 per cent., mast cells 0.4 per cent.

Urine.—No albumin, no sugar, no acetone nor aceto-acetic acid; urobilin present in large amount.

He came into hospital on the evening of June 29th; his blood still showed malarial parasites, but they were fewer in number than on the previous day. There had been no further attack of ague. No quinine had been taken before admission; 10 grains were given by mouth later in the evening; 30 grains a day were prescribed for the next three days, followed by 20 grains daily for a fortnight, and 10 grains daily for a further two months. The urine again contained no sugar. A full diet, including sugar, was ordered.

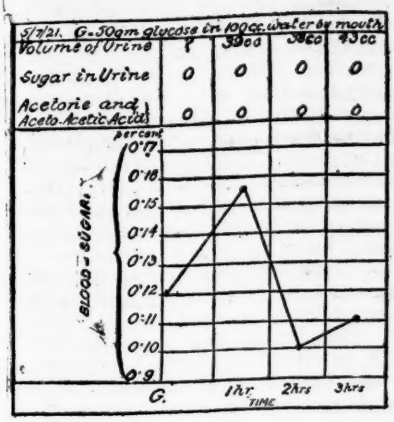
On examination on June 30th, 1921, the patient was well nourished, the skin slightly pigmented, the conjunctivae had a sub-icteric tinge, the glands were nowhere enlarged, and his general condition appeared excellent. Pulse, temperature, and respiration were normal. His weight (in clothes) was 11st. 9 lb. His teeth were in good condition, there was no pyorrhoea; nothing abnormal was to be seen in the mouth or throat. Thyroid, heart, lungs, and abdomen all appeared normal. Blood pressure was 105/85; liver and spleen were not palpable. His pupils reacted to light and accommodation; knee-jerks were present; the plantar reflex was flexor.

A specimen of the twenty-four hours' urine (52 oz.) examined on July 1st contained a very slight trace of sugar, no albumin, no acetone, no aceto-acetic acid, but a trace of urobilin. The sugar did not exceed 0.2 per cent. in concentration. Typical glucosazone crystals were easily obtained. No rotation was observed with the crude polarimeter available. After fermentation with yeast, the urine no longer reduced Benedict's solution, yet no gas had been collected in the inverted tube. Bial's test, and the phloroglucin hydrochloride test were both negative. The reducing substance was therefore, in all probability, glucose. Wassermann reaction, negative.

Sixteen different specimens of urine were tested for sugar in the next five days, all with negative results. The volume of the urine in the twenty-four hours was always normal, the highest measurement recorded being 54 oz. During his week's stay in hospital the following results of tests were obtained.

* This investigation will be included at a future date in a report to the Medical Research Council.

(1) *Pancreatic Function:* Loewi's adrenaline mydriasis test, negative; diastase in blood plasma, 6.7 units (normal); diastase in urine, 20 units (normal); creatorrhoea, nil; steatorrhoea, nil; bulk and general appearance of faeces, normal.



(2) *Kidney Function:* Albuminuria, nil; deposit, nil; oedema, nil; urea concentration test (Maclean and de Wesselow)—at end of first hour, 1.87 per cent. (vol. 240 c.cm.); at end of second hour, 2.34 per cent. (vol. 120 c.cm.), that is to say, a normal result. Diastase in blood and urine (see above), normal.

(3) *Blood:* Sugar curve July 5th, 1921, after 50 grams glucose on an empty stomach in the morning, result normal, though it was unfortunate that no estimate was made thirty minutes after the dose of sugar. Glycosuria, nil throughout test.

Remarks.

The diagnosis of "glycosuria of malarial origin" is preferred to that of "very mild diabetes mellitus in a malarial subject," owing to the negative findings in a fairly exhaustive clinical and chemical study. The family history of diabetes would naturally suggest caution. The case should be a very instructive one with which to keep in touch for several years. It is unfortunate that, while under my observation, the nature of the reducing substance in the urine could not have been more conclusively established, but the history makes it extremely unlikely that it was anything but glucose.

It is interesting to speculate as to the site of action of the malarial toxins. Possibly the glycosuria may have been due to diminished glycogenic function of the liver and other tissues. Presumably the urobilinuria resulted from destruction of red blood corpuscles by the malarial parasites, but, in part at any rate, may have been due to the effect of their toxins upon the liver. The islands of Langerhans may have suffered from the toxic action, so that the supply of internal secretion was insufficient to prevent glycosuria on a full diet. Against this is the fact that all the pancreatic function tests performed were negative; it would probably be objected, however, that such tests are too crude. Owing to toxic action on the kidneys their "leak point" temporarily may have been lowered. The type of blood-sugar curve may be said to give some slight support to this hypothesis, for it is not altogether unreasonable to imagine that four days after evident glycosuria the curve should have revealed some degree of hyperglycaemia unless the glycosuria was of the renal type.

Lastly, we may picture a toxic influence on several of the ductless glands, so that the balance between their secretions was upset in such a direction as to cause glycosuria. Of course, there is always the possibility of two or more of the above causes being simultaneously at work. Such theorizing may seem a waste of time and space, but obviously suggests several possible lines of research in malarial patients that might be of interest if not of real value; for instance, (1) examination for glycosuria before treatment, and (2) blood-sugar curves to decide, among other things, if the glycosuria is renal in origin.

Turning now to the malaria itself in this particular case, the differential blood count is noted as unusual (250 cells were counted). Though probably of common knowledge to pathologists with experience in malaria, it was of interest to me to find a number of benign tertian parasites in the peripheral blood (on June 28th and 29th) without any further attack of ague. As in the two cases previously published, so in this instance the glycosuria cleared up with quinine in the absence of dietetic treatment; in fact, sugar was deliberately included in the diet throughout the stay in hospital.

OVER FIVE HUNDRED GALLONS OF FLUID FROM AN OVARIAN TUMOUR.*

BY

JOHN D. MALCOLM, F.R.C.S.EDIN.,

AND

G. A. GIBB, M.D.

THE cyst from which this fluid came was noticed in 1893, when a surgeon was consulted and advised against operative treatment. The abdomen was tapped in the autumn of that year. There is no record of the tappings until 1904, but as a conservative estimate there were twenty-five before that date. G. A. Gibb has kept a record since then. The tappings increased gradually from four in 1904 to from thirty-four to thirty-six in each of the last four and a half years. The amount removed was always as nearly as possible 11 pints, and, counting twenty-five for the first ten years, there were 368 tappings in all. Taking 11 pints on each occasion, the total is 4,048 pints, or 506 gallons, which would weigh considerably over two tons.

In 1899, after about six years' tappings, the late John Langton tried, and failed, to remove the tumour. On July 20th, 1906, John D. Malcolm tried again, with the same result.

Almost to the last the condition of the patient was fairly good. She got up and about and ate enormous quantities of food, except just before the tappings, when she suffered from nausea and vomiting. The legs were oedematous as early as 1906.

The tappings in recent years were always performed with a trocar and cannula having a diameter of one-eighth of an inch. The evacuation was usually completed in about fifteen minutes. There was never any adverse symptom. Occasionally the puncture leaked, and then the need for the next tapping was delayed. Hard masses remained after each tapping, and these were never the same shape.

On June 30th, 1921, when a tapping was about due, the patient was seized with abdominal pain and vomiting, and she was tapped without relief. One-third of a grain of morphine hypodermically removed the pain, but vomiting continued, and the patient died early on July 6th at the age of 67.

At the autopsy 4½ pints were removed, leaving a secondary cyst five inches in diameter lying on the left pelvic brim. It was obvious that this secondary cyst would soon have burst into the main cavity, and that a development and rupture of secondary cysts caused the constant change of shape observed after the tappings. There was also much papillary growth from the cyst wall. A piece of this was described by Dr. C. Fletcher as having

"the histological structure of a serous papillary cyst of the ovary. The epithelium covering the papillary processes is of a low columnar (cuboidal) type, and there is in places a deposition of salts from the secretion. The stroma is of very dense fibrous tissue with areas of commencing infiltration with lime salts. The tumour is innocent."

As in 1906, the cyst was everywhere firmly adherent, and its wall was so friable that many hours of careful dissection would have been necessary to remove it. The intestines occupied a very small space at the back of the abdomen. They were not distended. No peritoneal cavity was found. The liver when exposed was smooth and not enlarged. The other organs were not examined.

One of us (G. A. Gibb) has found the following record on a tombstone in Bunhill cemetery, City Road, E.C.:

"Here lies Dame Mary Page, relict of Sir George Page, Bart. She departed this life March 11th 1728 in the 55th year of her age. In 67 months she was tapped 66 times: Had taken away 240 gallons of water without ever repining at her case or ever fearing the operation."

Possibly this lady had an ovarian tumour.

Sir John Bland-Sutton has drawn our attention to a case recorded by Dr. Pye-Smith.[1]

Dr. Pye-Smith's case was that of a woman suffering from papilloma of both ovaries with secondary deposits on the peritoneum; she was tapped 299 times in Guy's Hospital between 1884 and 1893, when she died at the age of 44. The

* This case was referred to in the President's valedictory address to the Obstetric and Gynaecological Section of the Royal Society of Medicine in 1920. Proceedings of Section, vol. xiii, p. 212. The record is now complete.

fluid in this case was secreted into the peritoneal cavity. The amount removed is not given, but as much as 16 and 18 pints were withdrawn at a time, so that the total quantity might possibly be greater than in the case now recorded. This patient also "ate, slept, and looked well" after many tappings. Dr. Pye-Smith stated that he should have recommended early operative interference more urgently than he did, because removal of a primary papilloma is sometimes followed by shrivelling of the secondary growth and a complete cure.

The case now related shows that sometimes an ovarian tumour causes death simply from exhaustion and pressure. The enormous appetite of the patient was an index of the nourishment required by the growth, and it was only by constantly removing the pressure that the patient could be kept alive. There can be no reasonable doubt that she could have been easily and completely cured if an operation had been performed as soon as the cyst was discovered. It is clear that as late as 1893 some surgeons did not recognize the importance of early interference in these cases.

Reference.
Transactions of the Pathological Society, vol. xliv, p. 111.

A METHOD OF SKIN-GRAFTING.

BY
SAMUEL SAMUEL, M.D., Ch.B., M.R.C.S.Eng.,
Late Captain R.A.M.C.

The operation of skin-grafting, usually regarded as a trivial and simple procedure, is not always attended with the success that one would expect. During the war, when skin-grafting was so frequently employed, faulty technique, especially the omission of details of procedure, often led to a failure of the operation. The following method which I adopted gave invariably good results.

The accompanying diagram is almost self-explanatory and calls for very little description. The grafts and area to be covered are prepared in the ordinary way, and the grafts are applied to the skin-free area in the usual manner. Silk threads are then carried from one side of the surrounding healthy skin over and through the graft and into the underlying granulation tissue, as the diagram explains, and then through to the healthy skin on the opposite side. The grafted area is then covered with perforated sterilized protective (preferably the transparent variety which is used in America for watching the progress of wounds—the perforations being easily made with the punch used for making holes in Carrel-Dakin tubes), which is then anchored in position as per diagram. On top of the protective is then placed the thick layer of sterile gauze damp with the physiological saline or artificial serum, and then a final over-all dressing consisting usually of a thin layer of dry sterile gauze. The silk threads are then utilized, as the diagram shows, for anchoring all the dressings, the silk being finally threaded through thin rubber tubing and then knotted on the tubing to prevent cutting through. The knots are tied so that they can be easily undone, and the ends of the silk threads are left long. The whole of the operation area is then covered with a layer of wool and the usual bandaging is applied.

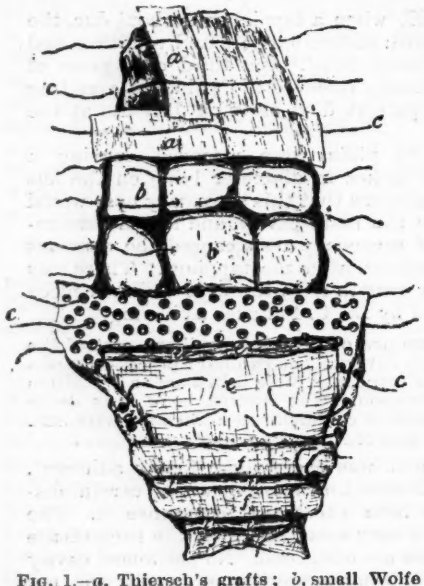


Fig. 1.—*a*, Thiersch's grafts; *b*, small Wolfe grafts; *c*, silk threads; *d*, protective; *e*, deep dressing—thick layer of sterile gauze: *f*, over-all layer of aseptic dressing: *t*, rubber tubing.

By this method the grafts can be easily and frequently fed, after removing the bandage and wool, by squeezing the artificial serum or saline from a swab on to the silk threads between the dressings and the skin, or additionally, by undoing the knotted threads and taking out and replacing the damp thick layer of gauze. The silk threads not only carry the feed, but act as in the operation for lymphangeioplasty and drain away the discharge which forms round the granulations. The amount of the discharge also is lessened by the frequency and simplicity with which the feed can be given. The great advantage of this method is that it is not necessary to disturb the grafts and there is little risk of doing so as with the old methods when the dressing is changed on the third or fourth day. A change of new sterile protective is also unnecessary. Curling and retraction of grafts does not so readily occur and healing is accomplished more certainly and more quickly. The anchoring of the grafts and the dressings is also beneficial in providing the means for applying firm gauze pressure, which is so essential for ensuring success, and for keeping grafts and dressings in position in cavities and hollow surfaces and over convex areas such as the shoulder, breast, and ischium. Grafting over the latter area, previous to the adoption of this new method, was rarely successful because of the difficulty of keeping the grafts in position, and of keeping clean the parts, which often become soiled by the dressing shifting to the anal area. The use of splints, strapping, and the application of collodion is thus also done away with. When the transparent variety of protective is used the state and progress of the grafts can be watched each time a new feed is given when the thick layer of damp gauze is replaced by a fresh one.

The only disadvantage of this method is the little extra time involved in performing the operation. This naturally becomes less and less with practice, and is readily compensated for by the greater percentage of successful cases.

The method adopted can thus be briefly stated as consisting of the principle of the application of the method of lymphangeioplasty combined with that of anchored dressings.

EIGHTY-NINTH ANNUAL MEETING
OF THE
British Medical Association.
Held at Newcastle-on-Tyne, July, 1921.

SECTION OF SURGERY.

Professor J. Rutherford Morison, D.C.L., LL.D., F.R.C.S., President.

DISCUSSION ON COMPOUND FRACTURES OF THE THIGH AND LEG.

OPENING PAPER

BY
Naughton Dunn, M.A., M.B., Ch.B.Aberd.,
Surgeon, Royal Spinal and Orthopaedic Hospital, Birmingham; Consulting Orthopaedic Surgeon, Ministry of Pensions, West Midlands Region.

Successful treatment of compound fractures demands a thorough knowledge of the treatment of fractures by external splintage. Before the war the results of the operative and non-operative treatment of simple fractures was a subject of investigation by a special committee of this Association. In nearly every age-group operative cases showed a higher percentage of good results than non-operative cases. The suggestion to an unbiassed observer was that operative technique would in time almost entirely supplant treatment by splintage.

I think you will agree that as a result of the war the outlook is changed. In the early days the compound fractures presented a problem which could not be solved by operation. The splints of the textbooks got a fair trial and were found wanting. The minds of the greatest surgeons of all countries were endeavouring to devise means for the fixation of the compound fracture of the lower extremity, and only after two years did it become

generally recognized that life, limb, and function could be best conserved by the use of a splint first offered to the profession by Hugh Owen Thomas of Liverpool almost half a century ago.

During the latter years of the war it replaced all others. Its ready application allowed of its use in the front line. The fixation it offered diminished shock and prevented further injury to the tissues during transport—while the principle on which its efficiency depended was surpassed by no other in the hospitals specializing in the treatment of fractures of the lower extremity. That it was effective is proved by the fact that at one period the statistics of 500 cases of compound fracture of the femur under treatment at the orthopaedic centres in this country showed an average shortening of less than half an inch.

The compound fracture differs from the simple fracture in that there is as a rule a greater degree of shock; there is the risk of acute primary infection; complete union is as a rule delayed, and there is the possible complication of chronic sepsis, resulting from the presence of sequestra or infection of a cavity in bone. It behoves us now to review our experience of the last seven years, and to lay down certain definite lines on which compound fractures and their complications should be treated in civil life.

Emergency Treatment of Compound Fractures.

One of the most important factors in reducing the mortality from compound fractures of the femur in France was the early and efficient fixation afforded by the use of the Thomas splint. We may therefore safely urge the authorities at home to provide this form of splint as a standard in cases of civil accidents.

The emergency treatment of a compound fracture of the lower extremity consists of:

1. Exposure of the wound by slitting the trousers to allow of the immediate application of a sterile dressing.
2. A tourniquet is applied if necessary.
3. The Thomas splint is then threaded on to the leg until the ring impinges on the tuber ischii. Extension of the limb to the end of the splint is maintained either by a clove hitch round the ankle, or by a bandage attached to a metal clip (Tapson's) gripping the sole of the boot.
4. Suspension of the end of the splint diminishes the discomfort of transport.

Shock.

My service abroad did not allow of an adequate experience of the treatment of shock following compound fractures. I will therefore take the liberty of quoting *The Early Treatment of War Wounds* (H. M. W. Gray) in this connexion. Experience abroad indicates that while different individuals may vary widely in their capacity to withstand shock, haemorrhage, cold, and pain are factors which aggravate it and must be combated. As the result of shock and haemorrhage the body suffers two great losses, a loss of its fluid reserve and a loss of its alkalis.

The failure of intravenous saline to sustain blood pressure in these cases was noted during the war, and the use of a solution of gum acacia in saline was more effective. Direct or indirect transfusion of blood was found to be indicated in any case where a blood pressure of at least 85 mm. of mercury could not be sustained by other means. Where symptoms of acidosis are likely to be present, alkalis should be freely administered by the alimentary tract, or, if necessary, intravenously.

Operation in Compound Fractures.

As regards anaesthesia in cases of shock, the superiority of gas and oxygen has been amply proved by various authorities. The nature and extent of the infection which may develop as a result of a compound fracture is still a matter of uncertainty. It is a safe rule in these cases to operate early. The extent of the operation will necessarily vary with the circumstances of the case.

Our object must be to remove all severely damaged tissue. The skin and muscle leading to the site of fracture should be excised. Blood clot and completely detached fragments of bone should be removed, the wound washed thoroughly with spirit and a film of bipp applied to its surfaces. The wound may then be sutured and temporary drainage established, or we may decide to irrigate freely until healthy granulation tissue and the absence of sloughs allows of secondary suture. Antitetanic serum should be given as a routine in all cases of compound fracture.

Treatment by Splintage.

Efficient splinting requires:

1. Replacement of the main fragments into their normal anatomical position.
2. Immobilization of the limb so that there is no disturbance of the fragments in moving.
3. Avoidance of compression of the limb and easy access to all dressings.

Its efficiency will also be judged by the relative comfort it affords the patient during treatment, and the end-result as regards function. I believe the Thomas extension splint will meet these requirements for all fractures of the long bones of the leg below the upper third of the femur. Compound fractures of the upper third of femur require special consideration. The deformities and disabilities following fractures inefficiently treated are almost constant, and a knowledge of these must guide us in our treatment.

Fracture of the Upper Third of the Femur.

The common result of malunion in fractures of the upper third of the femur is flexion and abduction of the upper fragment. Excellent results may be obtained by:

1. The Jones abduction frame. By this means fixed extension in the abducted position is secured, while fixation of the spine and hip results in relaxation of the psoas and iliacus muscles.
2. Pearson used the simple Thomas splint fixed with the limb flexed and abducted. By means of his sectional bed, nursing of these cases was possible without disturbing the relation of the fragments.
3. For cases of fracture of the upper third of the femur, associated with severe buttock injuries, Sinclair devised a special net bed suspended in an oblong wooden frame. This allowed of easy dressing, while the fixed abduction of the limbs and body weight of the patient assured adequate extension in a position of abduction and flexion.

Compound Fractures of the Shaft of the Femur.

The common forms of malunion resulting from fractures of the shaft of the femur are:

1. Outward angulation at the site of fracture;
2. Sagging of the fragments;
3. Internal rotation of the limb below the fracture.

The Thomas splint has now been recognized as the standard splint for the treatment of these fractures, and I will here describe in detail its application.

Extensions having been applied to the limb from the ankle to two inches below the site of the wound, a Thomas splint, bent at the level of the knee-joint to an angle of 160 degrees, with a well-fitting ring is passed over the foot until the ring impinges on the tuber ischii. While the limb is held by an assistant, a double flannel bandage four inches wide is fixed to the lateral bars by a clip at the site of fracture. This band should be sufficiently tight to ensure the normal anterior bowing of the femur when the extensions are tied to the end of the splint. Other suspensory bands are then applied from the buttock to a hand's breadth above the heel. They should be sufficiently tight to support the limb, but not so tight as to render the band at the site of fracture loose.

A serrated wooden footpiece (Sinclair's) attached by glue to the foot is a useful adjunct both in supporting the foot and in controlling rotation of the limb so as to obtain anatomical reposition with the upper fragment.

In order that the splint may easily follow the movements of the patient, it should be suspended by weight and pulley. By raising the foot of the bed ten inches and tying the splint to a vertical bar at the end of the bed, body weight may be utilized as a secondary extension. This will also obviate undue pressure of the ring on the tuber ischii.

The position of the fragments and the results of treatment should be tested by *x* rays at intervals. As soon as there are clinical signs of union graduated exercises of the knee may be allowed. This may be done while extension is maintained by means of a duplicate of the lower portion of the Thomas knee splint, hinged at the

level of the knee-joint. The extensions and supporting bands are transferred to this and gradually increasing movement of the knee allowed.

At the end of ten to twelve weeks, if union feels firm, the splints may be discarded and physio-therapy employed to restore the musculature and movements of the limb. Weight-bearing without a protective calliper splint should not be allowed until the *x* rays show definite trabeculation of bone at the site of fracture.

As an alternative to extension by strapping or glue the use of callipers has been found effective, and was preferred by Major Pearson at his fracture hospital at Edmonton. These take a direct pull either above the condyles or the malleoli, while a locking screw on the stem of the tongs prevents undue penetration of the bone. With suitable dressing there was little trouble with secondary infection. In fractures of the lower third of the femur the special tendency to tilting backward of the upper end of the lower fragment must by guarded against by increasing the flexion of the knee and increasing the extension force.

Compound Fractures of the Tibia and Fibula.

We must anticipate and prevent the probable deformities in fractures of the tibia and fibula. These are valgus deformity at the site of fracture or, more frequently, failure to restore the normal curvature of the tibia, with sagging of the fragments. The resulting misdirection of body weight causes secondary flat-foot, with strain of the internal lateral ligaments of the knee-joint and an apparent genu recurvatum.

The Thomas knee splint with fixation of the knee and extension by means of a plaster anklet, or the Sinclair foot-piece should obviate the occurrence of these deformities, while allowing easy access to the site of fracture.

Compound Fractures involving Joints.

Where the nature of the fracture will not allow of the restoration of the normal contour of the joint surfaces by external splintage, operative reduction should be undertaken. This is especially to be recommended in cases of fractures involving the knee-joint, where a portion of the articular surface of the tibia or femur may be displaced from its normal relation with the main fragment. Unless the normal level of the fragments is re-established, instability of the joint and deformity on weight-bearing will result.

Effect of Compound Fractures on the Hip, Knee, and Ankle.

Limitation of movement in joints following compound fractures may result from either intra- or extra-articular causes, and is often aggravated by the prolonged immobilization involved in their treatment. The chief causes are the result of inflammatory changes in the soft tissues and in the joint surfaces. These lead to fibrotic changes in the muscles controlling the joint, and to fibrous adhesions both within and without the joint itself.

Limitation of movement in some cases is still inevitable. The steps to be taken to guard against it are:

1. Early fixation to prevent further infection of the tissues.
2. Early elimination of sepsis, either by primary excision of the wound, or free drainage and secondary suture.
3. Splintage which will allow movement of the neighbouring joints when acute inflammation has subsided.

In old-standing cases where limitation of movement is an established condition, we should depend on graduated splintage rather than sudden force applied under an anaesthetic. Where direct infection or destruction of joint surfaces renders ankylosis probable the treatment should be modified to ensure that this takes place in the most favourable position for function.

The best functional positions for ankylosis of the joints of the lower extremity are:

1. Hip.—Extension, 20 degrees abduction and 15 degrees external rotation.
2. Knee.—Full extension.
3. Ankle.—At a right angle with the leg.

Chronic Sepsis following Compound Fractures.

The chronic sinus is one of the most common sequelae of compound war fractures. These men have, as a rule, had many operations for the removal of sequestra, but the sinus persists. It persists for one of three reasons: either the removal of foreign material (in this I include all sequestra) has not been obtained; a septic bone cavity has been left; or the separation of devitalized bone—that is, potential sequestra—is not yet complete. For the first two the surgeon is entirely responsible; the last is a process of nature, which to my knowledge may take as long as nine months for its completion.

We must therefore appreciate the fact that success of an operation to eliminate discharge cannot be assured for a considerable time after the injury. The operation to be successful must be a radical one, and the question of when it is safe to open up fresh planes of tissue in the presence of sepsis arises. Certain clinical points should guide us in our decision:

1. The general health of the patient must be good.
2. There must be no signs of local reaction—for instance, oedema or tenderness at the site of fracture.
3. An absence of rise of temperature for at least three months.
4. History of only slight reaction after previous operations.

When these conditions are present I believe that the patient has reached the stage at which he has developed a natural immunity to his original infection, and discharge depends mainly on the presence of some body foreign to the living tissues, usually a sequestrum or metal fragment. Where there is uncertainty as to the immunity of the patient to the local infection, a preliminary course of Goadby's vaccine, a sensitized streptococcal vaccine, has been found effective in preventing reaction after radical operation for sequestrectomy in war wounds. The operation, which I will describe, is effective and final in over 80 per cent. of these cases.

Before undertaking this operation good skiagrams are taken in two planes so as to locate the sequestra. A 25 per cent. sterile mixture of bismuth and vaseline is then injected into the sinus under pressure. This penetrates to every point where infection is present, and further *x*-ray examination demonstrates the full extent of the infected area. The routine of the operation in fractures of the femur is as follows:

1. Excision of sinus.
2. Incision 8 to 10 inches long on the outer aspect of the femur.
3. Free subperiosteal exposure of bone extending both above and below the affected area.
4. The cloacae are probed and the cavity located.
5. Bone is freely removed until all sequestra are exposed and the cavity in which they lie converted into a groove, and its lining membrane removed.
6. The entire wound is then washed out with spirit, followed by rubbing with bipp until a thin oily film covers the entire surface of the wound.

Care is taken to allow the neighbouring soft tissues to fall into the cavity, and after adequate posterior drainage has been secured the wound is closed by deep and superficial sutures. The drainage tubes may usually be removed at the end of forty-eight hours.

The following history is typical of these cases:

Corporal G., on January 6th, 1916, sustained gunshot wounds of both thighs, with a compound fracture of the left femur. He was admitted to hospital in this country in October, 1916. The following is a summary of his notes:

December 17th, 1916. Sinus scraped.

March 6th, 1917. Large piece of shrapnel and band of brass removed, also sequestrum 2 inches long.

August 16th. Two sequestra removed from shaft of femur.

September 20th. Discharging as freely as ever, very offensive.

December 17th. Operation: wound opened up, many small pieces of bone removed from sinus, which completely perforated femur. Free drainage established through femur to wound on inner side of thigh.

January 16th, 1918. Fracture united; considerable discharge from sinus in middle of femur. *X*-ray examination shows numerous sequestra embedded in new bone.

May 16th. On this day a radical operation was undertaken. A long incision was made on the outer side of the thigh, and free subperiosteal exposure of the femur obtained. A mass of overhanging bone having been removed, a cavity in the femur

containing numerous sequestra was exposed. After treatment with spirit and bipp, the cavity was filled with an attached muscle flap. Two rubber drainage tubes were inserted to secure drainage, and the wound closed

May 18th. Drainage tubes removed.
May 28th. Stitches removed.
June 11th. Wound quite healed.
The wound has remained healed since.

Some of you may have come to the conclusion, from the slides I have shown, that the equipment used for these cases is complicated and not likely to be readily available. I wish before I finish to show you two cases to impress upon you that the foot-piece and the suspension apparatus, while desirable, are not absolutely essential.

The first is a badly comminuted compound fracture of both bones of the leg; you will note the simplicity of the apparatus, the effectiveness of the extension, the ease of dressing, and the final result.

The second is a case of compound fracture of the upper third of the femur. You will notice in the first radiograph the metal bar of the interrupted long Liston splint, and the extreme displacement of the fragments. The following radiographs and photographs show the result of treatment on the Jones abduction frame.

Some surgeons of experience may prefer other forms of splintage for the treatment of these cases, and the results in their hands may be equally good. My intention in this short paper has been to emphasize the simplicity of the Liverpool splints, and the fact that they can be used effectively either in the cottage or the hospital.

DISCUSSION.

Mr. A. H. TUBBY (London) thanked the President of this Section for inviting him as President of the Section of Orthopaedics and Diseases of Children to take part in this discussion. He (Mr. Tubby) was of the opinion that whilst the Thomas splint or its modifications was invaluable during the transport of patients from the fighting area, yet it was not necessarily the only or the standard apparatus available for treatment of these fractures in all stages. A drawback to its universal employment was that its use presupposed a thorough knowledge of its application by all medical officers, and Mr. Tubby had found that this was very far from being the case, at least in the war areas in the Near East. Many cases had come under his observation at the Base, where Thomas splints had been applied, which left very much to be desired. So that he and his colleagues often reverted to other methods, notably Mr. Hey Groves's modified wire splint, which permitted flexion of the hip and knee, with adequate extension on the foot and leg. Difficulties were encountered over this latter point, but they were usually overcome by using Sinclair's glue in place of the ordinary adhesive strapping. With the glue, extension weights up to 40 lb. could be maintained on the limb for some weeks without the strapping dragging away. From his experience Mr. Tubby found that in some cases it was desirable to apply much greater extension force to the limb than was customary. Thus, after operation for mal-union of the femur, a traction force of over 40 lb. had been applied with successful results.

In some severe and exceptional cases transfixion of the condyles of the femur by a pin had been done, where no other means of securing a firm grip on the lower fragment of the thigh was feasible. He (Mr. Tubby) quite realized the possibility of suppuration, and later of ostitis and sclerosis, following the introduction of the pin; but he was agreeably surprised to find that the cases, whilst under under his observation for several weeks, very rarely gave trouble if care was taken to apply iodine frequently to the skin at the points of perforation. It was realized that to achieve the immediate object of controlling the fragments some risk of future trouble had to be faced. The opportunity of following up the cases, after they had been transported home, were very imperfect at the time; but on his return, Mr. Tubby had heard from the commanding officers of several hospitals at home that the condition of the patients after compound fractures of the thigh treated in Egypt was good. It was certain that equally satisfactory results could be obtained by several methods, provided that each was fully understood, and watchful care over the position of the fragments and length of the limb was observed from first to last. Every method had its own special indication and employment.

Mr. HAMILTON RUSSELL (Melbourne) disagreed with Mr. Tubby as to the excellence of the results obtained by Professor Hey Groves's method of extension of the thigh from a metal bar driven through the condyles. The late results, as seen in the Melbourne military hospitals, had been very bad; prolonged sinuses lasting for years had been of frequent occurrence, and he cited one case under his own care in which amputation had become necessary from suppuration that had extended to the knee-joint. He pointed out that the methods of wound treatment in compound fractures had arisen largely by reason of the special characters of war injuries as distinguished from those seen usually in civil practice; the injuries of civil life, however, remained what they were before, and it was necessary to exercise a wise discrimination in introducing methods appropriate to war injuries into the much milder type of cases usual in civil practice. He pointed out that, in any case, open fractures must be regarded as infected wounds, and that the first principle of treatment should be to conserve the resisting power of the tissues to bacterial invasion. With this object he deprecated the application of powerful antiseptics, and briefly detailed the ritual he had laid down for his students, in which, after preparation of the limb as for an operation, the wound itself was cleansed only with sterilized salt solution.

Mr. C. MAX PAGE (London) said: A consideration of the subject under discussion in all its ramifications would involve most of the major problems of surgery. The opener has tended to confine his attention to the methods of splintage suited to fractures of the lower extremity. The methods he has detailed are, I think, those generally accepted as the most satisfactory by all who have had during the past seven years an intensive experience of the condition under review. I propose therefore, in the first place, to make some observations which deal more particularly with the early treatment of the wound in the varying types of compound fracture, and will terminate by raising one or two points in which I am not in agreement with previous speakers.

Before going further I should like to say a few words about the nomenclature of these injuries. The old-fashioned and well-established term "compound fracture" is held to mean any fracture in which there is a breach in the tissues extending from the skin to the bone at the site of fracture. The term "open" has been proposed as a substitute, and, as it gives some indication of the condition present, and is less liable to misinterpretation, I think it is a better one to use.

Considering the immediate treatment of an open fracture, the essential aim is the conversion of the fracture (for working purposes) into a simple one. It is common ground that the prevention of the development of infection in the wound depends on the action taken within twelve hours of the injury. Exactly what this treatment should be is therefore of the first importance. It varies, I think, with the nature of the wound of the soft parts. One must clearly distinguish three types of the condition. These three types may be termed: (*a*) Direct, (*b*) indirect, and (*c*) secondary compound or open fractures.

(*a*) Direct open fractures are those in which the skin and underlying tissues down to and including the bone have been broken by violence acting from without. Examples of such fractures are those due to missiles and those caused by run-over accidents.

(*b*) Indirect open fractures are produced by the protrusion of the fractured bone through the skin from within outwards as the result of a force acting after the continuity of the bone has been broken. These fractures are by far the commonest type of open or compound fracture met with in civil prrctice.

(*c*) Secondary open fractures result from the sloughing of the skin and underlying tissue over a simple fracture. The sloughing may be due to the bruising from the primary injury, to splint pressure, or to suppuration arising in the haematoma about the fracture.

It is clear that the nature and extent of wound contamination varies widely in these three types. In (*a*) gross infection right down to the bone is almost necessarily involved, and at the same time the local trauma leads to a severe depression in the antibacterial properties of the tissues involved; this latter factor is probably the most important one in allowing the infection to get a serious

hold. It is this type of fracture which is liable to fulminating infection with gas-forming organisms or the streptococcus. In (*b*) infection occurs initially on the surface of the wound. The deeper part of the track only becomes infected by the reposition of the fracture carrying bone which has been exposed and probably contaminated back into the deeper parts of the wound; in (*c*) the process of sloughing is a relatively gradual one, and if the skin overlying in the damaged area is treated with the usual surgical precautions no serious or acute infection should ensue.

Immediate operative treatment is called for only in cases of the first two types. In (*a*), cases of direct injury, this can only be effected by the complete excision of the wound track from the surface down to and including the damaged bone. It is not always possible to make a clean section of the bone in cases of complete fracture without involving an unjustifiable risk of shortening or non-union; further practical difficulties which stand in the way of complete execution of this method may exist in the close relationship of main nerves or vessels to the wound track. In such circumstances free drainage must be afforded after operation in order to limit the extent of any infection which may arise. In any case, the exposed surface is treated with paraffin or bipp. If this line of treatment has been carried out extensive gas gangrene will not occur in the limb and the toxaemia from a streptococcal infection should be a limited one. It is, of course, in this type of case that the question of primary amputation will have to be decided upon, and that will always remain a matter of clinical judgement. In the case of (*b*), indirect infection, if possible the immediate treatment should fix the limb in a splint with the bone still protruding from the wound, reduction of the deformity not being allowed until thorough surface disinfection has been carried out. As soon as proper conditions are available an anaesthetic should be given and the surface wound and the protruding bone should be cleanly excised. In some examples of this class the skin wound is a mere puncture made by the sharp fragment of a long bone. If the clothing overlying the puncture is not torn through by the injury the necessities of the case are met by merely painting the surface with a solution of iodine or similar antiseptic.

Leaving on one side the treatment of established infection in a fracture, I should like to comment on a few points raised by other speakers. With regard to internal fixation by means of plate, wire, or other foreign substance, I am convinced that the use of such materials is undesirable in fractures of type (*a*), direct open fractures. One cannot exclude the presence of infection in the wound, and the extra manipulation alone involved in their use must lower the local resistance and so prejudice the course of the case.

Mr. Dunn gives an important place to the tourniquet in his list of the first-aid requirements for these fractures. From my experience I should say that in unskilled hands its use is subject to great abuse. When its application is imperative, definite instructions should be given that it is not to be left in place for more than an hour; the treatment of the haemorrhage on surgical lines should be carried out at the first opportunity.

With regard to the use of physio-therapy in these cases, if the infection is slight or localized, I think use of these methods should be commenced much earlier than Mr. Dunn indicates. Muscles and joints at a distance from the fracture should certainly be kept moving from the first few weeks of injury.

The use of transfixion pins and callipers to produce extension have their place, but their use requires care and experience anywhere near the knee-joint.

For fractures of the tibia and fibula I consider that, though the Thomas splint is useful if there are extensive discharging wounds, fixation is more easily and satisfactorily secured by means of a plaster-of-Paris case with suitable interruptions as soon as the infection of the wound is under control.

One last point in regard to the operative treatment of the chronic sinuses which may arise late in cases which have been infected. I should say that after operation deep and superficial sutures should be used with caution; in instances in which the operation on the infected bone is incomplete their insertion prolongs rather than shortens convalescence.

Mr. HENRY WADE (Edinburgh) said: No one will gainsay the fact that we have learned many valuable lessons in the treatment of compound fractures from our experiences during the late war. At the same time I think it is very important to remember that the compound fracture we meet with in civil life is very different from the gunshot wounds of war time, and that it is not advisable to apply too rigidly the methods we employed in dealing with these latter cases to the accidents of civil practice. During the war we administered antitetanic serum to all our cases. Personally, I must confess that in many cases of compound fracture, especially where the skin has been broken in a clean puncture by the sharp end of the broken bone, I do not administer it. Is this practice wrong?

In the later stages of the war it was our custom to carry out a complete excision of the wound—skin, muscle and bone—in virtually all our cases of compound fracture. This is of great value, of course, in certain cases that we meet with in civil practice, but personally I only do this in the minority of them. In the majority the break is a clean one; the damage to the muscle and skin is slight, and my practice is to cleanse the wound with an aseptic solution without using any chemical antiseptics. The results that follow this treatment appear to be good.

So strongly do many of us realize the value of the Thomas splint as an emergency treatment for fractures of the lower extremity that we have been recently conducting, in conjunction with certain of our colleagues who are located in the industrial districts in our vicinity, a campaign to encourage its more widespread employment in all such cases. No one has questioned the unique and pre-eminent value of the Thomas splint for such work, but when the patient is admitted to hospital I think it is important to remember that the necessity of any splint being employed must be first of all taken into consideration.

It is our practice, and we teach our students, that after the fracture has been set in many cases the posture in which the limb is placed will suffice to maintain the broken bones in satisfactory apposition and accurate alignment. In certain cases the application of extension by adhesive plaster, a weight and pulley, with the foot of the bed elevated, will be all that is required for this purpose. In others it will be found necessary to place the limb between sand-bags as well as carrying out the former treatment.

In all fractures we emphasize the vital importance of carrying out massage of the limb from the time of the accident onwards, and passive movement—to be followed later by active movement—of all the neighbouring joints. The splint we look upon as an unfortunate necessity in certain cases, for the use of which we almost apologize. In many cases of fracture of the femur, however, a splint will be found to be necessary, especially in fractures of the upper third and lower third. For these we employ a Thomas splint unbent, but with a knee flexion piece attached to it. The great value of this is that it permits of the knee-joint being moved daily without disturbing the fracture. As extension must be carried out, of course, in the line of the thigh, adhesive plaster cannot be carried below the level of the knee-joint, and as this is insufficient in many cases to permit of suitable extension we employ Pearson's ice-tong callipers applied to the condyles of the femur. From the surgeon's point of view this is a safe and satisfactory line of treatment, and the patients do not complain of it producing any discomfort. A most important adjunct to our treatment is the Morrison R.I.E. bed frame that we employ in all these cases.

For the treatment of fractures of the bones of the leg I have recently been employing in virtually all cases a bent Thomas splint. Extension, where it is required, may be obtained by grasping the malleoli with ice-tong callipers. To these rubber tubing is attached, which is tied to the end of the splint. By this means a comfortable, simple, and satisfactory method of extension is obtained.

Lastly, there is the difficult case of a fracture of the thigh or a fracture of the tibia, where, despite all our efforts, lateral deviation of one of the fragments continues to persist. For this we employ pressure pads which are attached to the Thomas splint and exercise lateral pressure at the point desired on the broken bone. In using these, however, it is of very great importance to

remember the readiness with which a pressure ulcer may develop. The responsibility of preventing this must be a personal one or the duty of a very well trained resident or sister.

Mr. G. H. EDINGTON (Glasgow) said: Civil cases differ greatly from gunshot wounds, the latter often having large, lacerated, and much befouled cavities. In civil cases the chief point to be kept in view is the risk of sepsis occurring in the injured osseous tissues. If this be constantly remembered, and efforts to prevent be employed, the results will be so much the better. The wound in the soft parts is covered by a preliminary dressing of lint and 1 in 20 watery carbolic solution and the surroundings are cleansed. Under a general anaesthetic the wound is thoroughly and forcibly douched with 1 in 20 carbolic lotion. Theoretically, this should damage the tissues; practically, such damage is quite immaterial, and may be neglected. For fractures of leg bones I find the half-box wooden splint all round satisfactory. If my efforts after asepsis have been successful, but good alignment of the fragments has not been obtained, the fracture may be plated in the course of a week. When this has been necessary my routine practice is to remove plate and screws at the end of the third or fourth week. My experience of Hey Groves's transfixion pin in femur cases has not been quite so favourable as some of the other speakers have found.

Mr. ANDREW FULLERTON (Belfast) said that owing to the condition of affairs in Ireland he had been obliged to return to the practice of war surgery. When on service in France during the war he had had the pleasure of being intimately associated with Major Meurice Sinclair, R.A.M.C., and of seeing the magnificent results of his work on fractures. So impressed had he been with these results that he had adopted them in his own wards at home. On his invitation Major Sinclair had, with the consent of the Director-General of the Army Medical Service, visited Belfast, and by his enthusiasm had stimulated house-surgeons and students to emulate his example and strive after the same results.

With the Thomas splint, in simple and compound fractures, proper alignment and length could be restored if adequate extension could be obtained. He and his house-surgeons were, unfortunately, unable to obtain the results with glue which Major Sinclair demonstrated, and he was more and more inclined to the use of screws or callipers on the tibia for the purpose of obtaining extension. Glue and strapping were liable to blister or to become loose, possibly from some error in technique.

His results with callipers inserted into the tibia had been universally good, and the patient who had had glue or strapping previously invariably preferred the callipers as being more comfortable. He avoided callipers or foreign bodies inserted into the femur in the neighbourhood of the knee-joint, and had seen no bad results from traction exerted on the lower fragment through the tibia and knee-joint. No evil results from sepsis had ensued from the use of callipers. His house-surgeons and dressers would consider shortening of an inch a disgrace, and most of the cases treated since the war had had no shortening. One case only showed an inch of shortening.

Excision of wounds had come to stay. In civil injuries, such as lacerated wounds, careful excision of all dead and damaged tissue, or primary closure of the wound, was followed in a large proportion of cases by primary union instead of suppuration, lasting possibly for months. No antiseptics were applied to the raw surfaces of the wound in his practice.

Professor RUTHERFORD MORISON (President of the Section) emphasized the importance of opening up all war wounds. He mentioned one particular case where he was deceived by the initial stages and apparent aseptic condition of the wounds: a man with a rifle bullet wound of the femur was admitted under his care; an aseptic scab covered each wound, the temperature was normal, the man's condition satisfactory: he was left alone, and for ten days nothing untoward took place. At the end of ten days the man had a rigor and developed infective osteitis of the femur with acute sepsis, of which he nearly died; he required two or three large operations but ultimately recovered. After that experience every case of the kind was opened up very freely, so that he got to the bottom of the wound. Each wound was bipped and sutured, and he never had any more trouble.

Mr. NAUGHTON DUNN, in replying to the discussion, said that he thought it was generally agreed that the Thomas splint was the most efficient splint for fractures of the lower limb. He regretted that Mr. Tubby should have spoken as he did on the use of this splint. He himself was certain that the best results were obtained from this splint and not from the Hey Groves apparatus and transfixion methods. He thought that as little splintage as possible should be employed.

THEORY AND METHOD IN EXTENSION OF THE THIGH.

BY

R. HAMILTON RUSSELL, F.R.C.S.,

Consulting Surgeon to the Alfred and Children's Hospitals, Melbourne, Australia.

WHY does shortening occur when the femur is broken? The answer is that it is brought about by the long muscles that are attached to the pelvis above and traverse the length of the thigh to be inserted into the upper end of the tibia and fibula. The shorter muscles that pass from the trunk to the femur and from the femur to the leg bones may be disregarded, for they cannot produce shortening. Moreover, the long muscles in the thigh are found on both flexor and extensor surfaces, an arrangement which renders shortening inevitable; were they found upon one aspect only, as is the case in the leg, shortening could be easily avoided.

The actual agency that produces the shortening is to be found in the "tone" of these long muscles; and "tone" means, for practical purposes, that the muscles are normally in a condition very like rubber bands slightly stretched. This condition of "physiological stretch" is clearly dependent for its maintenance on the integrity of the femur, which keeps the muscular attachments at their right distance apart. Immediately the femur is broken the muscles shorten and the ends of the fragments override. Here, however, the resemblance between the muscles and rubber bands ceases; for in muscle the contraction is vital and progressive, so that unless it is controlled by surgical intervention it will continue to progress and the shortening to increase until the femur unites; hence the excessive shortening invariably seen in ununited fracture of the femur.

When the femur is broken, then, the aim of treatment will be to pull out these long muscles to their normal length. I shall adduce evidence to show that a very moderate amount of force should suffice for this, were it not for two complicating factors. These are: (1) Active contraction of the muscles excited by mental apprehension, pain, or discomfort, and (2) the weight of the limb and the action of gravity. Neither of these complications is such as ought to add seriously to our difficulties. The weight of the limb in a recumbent patient means merely so much permanent addition to the extending force; the active contraction due to fear will quickly pass away when it is found that there is nothing to be feared; and that due to pain and discomfort will be abolished when we have rendered the patient comfortable.

And now as to the actual procedure: We want first to bring the limb into the best possible position. Needless to say, the surgeon does not merely lay hold of the leg and pull it; he will almost instinctively act as follows: Standing by the side of the bed he passes one hand beneath the knee and bends it slightly, while the other hand, grasping the leg just above the ankle, makes steady traction. He finds, however, that he cannot by this effort overcome the shortening, but he begins to think physiologically, thus: "The patient's muscles are contracting involuntarily. If I could stand here motionless doing this until the patient became quiescent and went to sleep, I should have no difficulty in drawing out the muscles to their proper length; and if I were able to keep it up night and day for six weeks the bones would unite without any shortening at all."

This, then, is the problem of treatment clearly indicated;

the way in which we attempted its solution is shown in the accompanying figure. This is a device in which

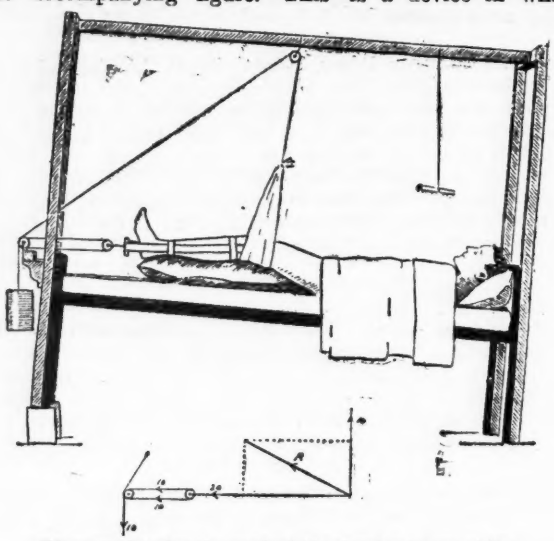


Diagram showing the method of extension in use at the Alfred Hospital, Melbourne.

small block pulleys and cord, together with a wooden framework over the bed, constitute the most striking features; the arrangement is such that the knee is supported and slightly bent while the leg is pulled upon, the pull upon the leg being approximately double the upward pull upon the knee. The general mechanical efficiency is indicated by the little diagram, which shows a parallelogram constructed on these two forces with its resultant lying approximately in the line of the thigh. There are two other very essential adjuncts —a box or some such support (not shown) for the foot of the sound leg, and a handle suspended over the upper part of the patient by means of which he can help to raise himself from the bed. The foot of the bed is raised upon blocks. For the last ten years or more this method has been used almost exclusively at the Alfred Hospital in Melbourne; it is astonishingly comfortable, far more so than any other apparatus known to me.

In fracture of the shaft, whether in the upper, middle, or lower part, the treatment is the same; in fracture of the neck I have had one or two results that have been disappointing, and others that have been very gratifying; perhaps it were unreasonable to hope for greater uniformity of good result in fractures of the neck.

In compound fractures of the femur the dressing of the wounded limb will be found remarkably easy. With his three sound limbs, the two hands grasping the handle suspended above him for that purpose, and with the sound leg bent up so that he can rest upon the foot, the patient will be able to lift himself freely off the bed without any pain while the dressing is changed; a process which, if well managed, should not necessitate his being raised up for more than a few seconds. In children, as might be expected, we have met with a remarkable uniformity of good result, and a little child a year old has been allowed to roll over on its stomach every night, without the slightest impairment of the result.

In many cases other than fracture we use this method extensively. In acute arthritis of the hip-joint the sudden transition from terrible suffering and much morphine to incredible relief and no morphine is one of the most dramatic things that surgery can show. Again, in ordinary hip disease with flexion, nothing is so efficient in bringing the limb down to the straight position. At the Melbourne Children's Hospital an infant of 9 weeks with streptococcal suppuration in the hip-joint was rigged up in this way with little pulleys and string by my house-surgeon. I was at first inclined to regard it not quite seriously, but the sister of the ward took it very seriously indeed. The nursing and general management were made so very easy; and the tiny patient lay quite comfortable and happy, came rapidly through its formidable illness, and made a complete recovery with perfect movement in the hip-joint. In bad fracture of the pelvis, a class of case very difficult to nurse, great comfort and help have been obtained from putting an extension on both legs; it will be readily understood how benefit from this might be expected.

Perhaps if I were asked what I consider to be the most valuable individual feature of this method, I should emphasize its diagnostic value during the early days of treatment; it would render impossible such a catastrophe as that to which I have alluded—namely, non-union with 3½ in. of shortening after ten weeks of treatment. If after the apparatus is applied the length has not come easily and perfectly right in the first twenty-four hours, I am at once on the *qui vive*. If it obstinately refuses to come right, and if, as probably will be the case, the contour of the limb feels not quite normal and a little lumpy and irregular about the fracture, then I conclude that there must be something intervening between the fragments which prevents them from coming into position, and operation is undertaken.

And now a few words with respect, and I may add "with all respect," to the Thomas bed-splint which is at present very generally employed in the treatment of fractures of the femur. The Thomas splint has been of such incalculable value as a means of transportation from field to hospital that I feel reluctant and almost ashamed at having to deny any claim made for it. I believe that it is not so good, nor nearly so good, as no splint at all in the treatment of fractured femur; and that for any sort of lesion above the knee it is unsound in theory, uncomfortable in practice and quite superfluous.

I said that I would adduce evidence to show that the amount of contraction force resulting from muscle tone must be very moderate, and therefore easily corrected by a correspondingly slight extending force. My evidence is taken from a study of fracture of the shaft of the humerus. In this case similar conditions are present to those which are answerable for shortening in the case of the femur, and doubtless if the humerus were treated like the femur in the horizontal position some overlapping of the fractured ends would be seen. But here the patient is allowed up, the arm lying comfortabiy against the chest, with the forearm slung at right angles by the wrist only; the weight of the elbow region of the arm will then exercise a slight but continuous extending force under the influence of gravity, and it is here seen that this slight force is sufficient to overcome the uncomplicated tonic contraction of the muscles, although the patient was a muscular man. I therefore conclude that the contractile force of muscle due to its tonicity is really very moderate, and that the greater part of the extending force which we use in the case of the femur is in reality expended in counterbalancing the weight of the limb.

Before concluding, I wish to allude to two matters that have become the objects of widespread error. The first concerns the part which it is alleged that muscular action plays in producing displacement and deformity after fractures. Let me say at once that this is a pure myth: there is no such thing as the displacement of fragments and the production of deformity by muscular action. Gravity may do it; and so may unsuitable apparatus. But let us clearly understand that if a limb, normal before the injury, recovers from the fracture with a deformity, whatever may have been the cause of the bad result it must not be ascribed to muscular action, but to something else that ought to be completely under our control.

The second error has to do with the ligaments of the knee, and the dangers that threaten them in the application of extension. It is perhaps not quite recognized that as soon as the femur is broken the ligaments of the knee are at once removed from all danger of being pulled upon during extension. Forgetfulness of this has often led the surgeon to face difficulties that need not have troubled him, and it has sometimes led to the employment of expedients that are in themselves actually dangerous, in the endeavour to shield the patient from a danger that is purely imaginary. There is no advantage, so far as I can see, to be gained from carrying the extension plaster above the knee; because when fracture has occurred the whole of the extending force will fall upon the long muscles of the thigh, none at all upon the ligaments of the knee, which are thrown entirely out of commission. How clearly correct this statement is will be rendered very obvious by the reflection that were the muscles to be severed in such a case the limb would drop off.

DISCUSSION.

Sir HAMILTON BALLANCE (Norwich) thought that the essential feature of treatment was adequate extension. He presumed that according to Mr. Hamilton Russell's method there would be no difficulty in the nursing arrangements, as the patient would assist the nurse; the pelvis and the thigh would easily rise. The same thing applied to the Thomas splint: the extension in Thomas's splint was transmitted through the muscles of the thigh and not through the ligaments of the knee-joint. He had never observed any injurious effects in the knee-joints from weight extension. The amount of extension necessary in fractures of the thigh in war wounds was not anything like as great as that required in civil practice. In war injuries a weight of 15 lb. was all that would be required, but in civil cases 25 lb. might be necessary. Sir Hamilton Ballance said that he preferred weight extension to fixed extension. He did not believe that the leg ought ever to be allowed to get loose within the Thomas splint as that meant a little displacement at the seat of fracture. He disliked glue for weight extension. Major Sinclair admitted that in 10 per cent. of the cases glue would cause an abrasion of the skin. In his own experience glue caused an abrasion of the skin in 50 per cent. Ordinary adhesive strapping was adequate for weights up to 25 lb. Calliper extension gave the most direct extension; it was not so necessary or so desirable in civil fractures. Fractures of the fibula and tibia should be treated in the Thomas splint, as they required extension as much as fractures of the femur.

Mr. MCADAM ECCLES (London) said he would venture again to suggest that in this twentieth century surgeons should avoid the terms "simple" and "compound" as applied to fractures and employ always the nomenclature "closed" and "open." In the open fracture of the femur he agreed with Professor Rutherford Morison that it was best to consider the wound septic in every case, and to open up and dissect out the edges of the wound in all its parts. Whether or not an antiseptic should be used must be a matter of individual opinion, but it was safer to use an antiseptic.

Then, with regard to splinting, it was important to have a means whereby early relief to pain and maintenance of alignment could be obtained. A Thomas splint appeared to have an advantage of helping to prevent external rotation. A sling behind the knee might press upon the popliteal vessels and nerves.

Mr. HAMILTON RUSSELL, in replying to the discussion on his paper, protested that he in no way underestimated the value of Thomas's splint. For transportation purposes it was invaluable, while for the treatment of fractures of the leg he preferred it to any other apparatus. But for fractures of the thigh he thought it quite wrong in principle. If used as a means of extension it had the fault that the extending force was exerted against a portion of the patient's body; this meant that if efficient it must be uncomfortable. Again, it failed to meet another cardinal requirement, in that it did not fix both the joints contiguous to the fracture, but only one of them. Finally, if, as seemed to be very usual, it was used simply as a trough or support for the limb, while extension was made by a weight, then he held that it accomplished nothing that could not be better accomplished without it. It was a complete error to state, as had been stated, that the Thomas splint was a source of comfort or that it aided nursing; the exact opposite was the case, for it was simply an addition to the weight of the limb and an unnecessary complication.

Mr. Hamilton Russell instanced the case of a man who fractured both thighs, returned to full military duty in fourteen weeks, went to France and fought for three years in the infantry. This patient's six weeks in bed while the bones were uniting were most comfortable, for he had liberal freedom of movement and the nursing was rendered very easy and convenient. He also instanced the case of a man who, a few hours after his femur had been divided for malunion, was able to lift himself high off the bed while a mattress was changed; this man was amusingly triumphant about it; he had previously had experience of a Thomas splint.

DISCUSSION ON THE DIAGNOSIS AND TREATMENT OF INJURIES OF THE INTESTINES.

OPENING PAPERS.

I.—G. GORDON-TAYLOR, O.B.E., M.S.Lond., F.R.C.S.,
Surgeon to the Middlesex Hospital.

THE diagnosis and treatment of intestinal injuries may demand the consideration of the surgeon, either when he is confronted by a severe or, mayhap, even a slight contusion of the belly, or when he is called upon to deal with a penetrating wound of the abdominal cavity. Four years' war surgery has evoked a wealth of surgical writing around the latter portion of the subject under discussion, and has furnished abundant practice therein; but the literature of the intestinal lesions due to contusions, run-over accidents, kicks and buffer injuries, has been but little augmented during those years when man has been maiming man with all the machinery of modern warfare.

Intestinal Injuries from Non-penetrating Wounds.

It is the traumatic rupture of intestine without any penetrating wound of the abdominal wall which is so difficult of diagnosis. James Berry and Paul Giuseppi in the end of 1908 made a most valuable contribution to the subject, basing their findings on 132 cases admitted to ten London hospitals in the fifteen years from 1893 to 1907 inclusive. They affirm that the diagnosis of rupture of the bowel rests not upon any single symptom or sign, but upon a careful consideration of all the facts dealing with the particular case under treatment; every case of abdominal contusion should be looked upon, when first seen, as a case of possible severe intestinal injury. Much help may be obtained from careful attention to the history of the accident, the manner in which the blow was inflicted, and the exact part struck. Although intestinal lesions are generally the result of the more severe forms of violence, nevertheless, it must be borne in mind that fatal visceral rupture may be caused by an apparently trivial blow.

V. Zachary Cope reopened the subject in 1913, and at the discussion which followed his paper and which dealt with the reports from ten London hospitals upon 44 cases admitted during the five years from 1908 to 1912 inclusive, it was pointed out that the more important symptoms detailed corresponded very closely with those in Berry and Giuseppi's series, and could be arranged in order of frequency thus: Abdominal pain, with or without marked tenderness; rigidity; vomiting; rising pulse; marked shock; bruising of the abdominal wall; dullness in one or both flanks; diminution or loss of liver dullness.

Sir George Makins especially emphasized the importance of sharply localized tenderness, which, although not constant, was, when present, the most valuable indication of all. Sir Berkeley Moynihan notes the value of Claybrook's sign, which consists in the transmission of the cardiac and the respiratory sounds, so that these can be heard all over the abdomen almost as well as, or possibly even better than, they can over the chest.

Cope urges that, if chest and kidney injury can be excluded, ruptured bowel should be suspected: (1) When abdominal pain persists for more than about six hours after an injury, especially if the pain is accompanied by (*a*) vomiting, particularly bilious vomiting; (*b*) a gradually rising pulse; (*c*) persistent local rigidity which tends to spread; (*d*) deep local tenderness with shallow respiration. (2) When abdominal pain is absent or very slight, but the pulse rises steadily and the patient is very restless or listless. It is important to exclude a spinal injury before making a diagnosis of intestinal rupture and undertaking an operation for the latter.

The prognosis in intestinal injuries is so intimately related to early diagnosis and to early operation that the case should be kept under the closest observation and the pulse rate counted at least every half-hour, and I would submit that whenever there is the slightest suspicion of any intestinal lesion the abdomen should be explored forthwith. Rapid operating, the use of Crile's local anaesthesia, with warm ether or gas and oxygen inhalation, and possibly the employment of blood transfusion,

will reduce to a minimum the risk of the actual operative manipulations, and the surgeon will have assured himself of the integrity of the intestinal canal or will have dealt with any damage that he may have found.

The exact management of the damaged bowel will be dealt with in a later section; it suffices here to say that if only a slight contusion of the intestine be found, it may be left alone. If the contused area is sufficiently damaged that a secondary perforation is liable to follow, then it should be turned in by suture, reinforced by omental grafts, or even resected.

The liability of the duodenum to retroperitoneal injuries must be remembered, lest an overlooked tear of this aspect of the bowel be followed by a fatal retroperitoneal extravasation and infective cellulitis.

The treatment of the peritoneum in these cases of ruptured bowel varies according to the amount of extravasation and the duration of time which has elapsed since the injury. If the effused bowel contents be strictly limited, dry sponging only should be employed, and the belly wall may be closed without drainage; if the escaping contents are widely spread, the gross infective material should be wiped up, and the pelvic cavity may be cleansed with a weak solution of flavine.

Intestinal Injuries due to Penetrating Wounds of the Abdomen.

The diagnosis of cases of intestinal injury due to penetrating wounds of the abdomen is not beset with the same difficulty that obtains in deciding whether the bowel has been damaged or not by contusions or non-penetrating injuries, and the indications for treatment are far more clear. Whatever be the injury—a stab with knife or dagger, a sword or bayonet thrust, a laceration with an animal's horn, a gunshot wound from bullet, shell, or bomb—the general principles of treatment are alike. No surgeon would advise an expectant line of treatment, nor assume the responsibility of abstention from operation; a penetrating wound of the abdomen probably means a penetrating wound of the bowel and demands the earliest surgical interference.

It is true that until the great war gunshot wounds of the abdomen received under conditions of warfare were placed in a special category by themselves in the matter of treatment, but the "expectant attitude" prescribed had always appeared to the civil surgeon bizarre and wrapped in mystery. Experiences in the Boer war had shown that laparotomy for abdominal wounds caused by rifle bullets was attended by a very considerable mortality, contrasting somewhat remarkably with the high percentage of recoveries in cases not operated upon; it was, indeed, said that one-third of the injuries of the small intestine and about two-thirds of the cases of injury to the large bowel recovered without operation. Such results from this *laisser faire* policy led to the surgical decision against operation for abdominal wounds under military conditions, and this opinion appeared to gain further support from experiences in the Russo-Japanese war, the French war in Morocco, and the Balkan war.

In the earliest period of the recent great war the "expectant" treatment obtained, save for a few operations performed sporadically by individual surgeons. Because of "the military situation," abdominal operations under anything like favourable conditions of time and environment were obviously impossible during the retreat from Mons, and in the early months of the campaign before the "line" became fixed; but even when abdominal surgery became a possibility military tradition died hard, and the old belief and confidence in the efficacy of the expectant line of treatment persisted. Experience in this "preoperative" period of the war, however, showed that at least 80 per cent. of the abdominal cases died, and that with the rarest exceptions wounds of the small gut were fatal injuries.

Then in the summer of 1915 Owen Richards of Cairo demonstrated, both by operative and *post-mortem* findings, that the abdominal injuries of warfare were of such a nature that recovery was not to be expected without surgical interference, save in a few instances. This demonstration of the extensive gut injuries which the bullet produced gave the lie to those advocates of the "expectant" attitude who had laid stress on the small lesions produced by the modern small-bore bullet and on their relative innocuousness. The enormous experience of the casualty clearing station surgeons amply vindicated the truth that the principles underlying the treatment of gunshot wounds in the intestine are alike in peace and in war, and that apart from certain few contingencies, dependent on time and place, there can be only one method of treatment for a penetrating wound of the coelom—early laparotomy.

Diagnosis.

The abundant literature relating to gunshot wounds of the abdomen during the recent war—a literature based upon so vast a wealth of experience—far transcends in magnitude any dealing with penetrating wounds of the abdomen received in any previous campaign or produced under peace conditions, whether the damage be inflicted by bullet, by dagger or knife, the spike of a railing, the horn of an animal, the instrument of the abortionist, or the maladroit efforts of some inexpert obstetrician. One's views upon the diagnosis and treatment of these penetrating wounds must therefore almost inevitably be those born of war experience.

An escape of faecal material or flatus from a wound involving the abdominal parietes, or even a portion of the body somewhat remote from the coelom, is self-evident proof of an intestinal lesion. An abundant and persistent discharge of blood from wound in the back, flank, or anterior belly wall, an ebb which flows the faster and with greater force when the patient coughs or makes any effort, will likewise suggest some deep visceral lesion and will call for surgical exploration. No comment is needed upon those cases where a portion of bowel or omentum projects from a wound in this region. Still more significant will be the diagnosis and still more urgent the need for resuscitatory methods and preparation for laparotomy if the wounded man is "shocked," blanched, or passing blood from the rectum, or if there is haematemesis. The situation of the wound may, however, not at first suggest an involvement of the coelomic cavity or its contents; it is, perhaps, hardly necessary to reiterate the frequency with which gunshot wounds of the buttock implicated the peritoneal cavity, and to emphasize the danger with which these injuries were fraught in the late war.

The wound of entry may be in the thorax, and, passing through the diaphragm, the missile may implicate the intestinal tract; it has been pointed out by others as well as by myself that the immediate prognosis of these abdominothoracic wounds is in very many cases largely determined by the nature of the abdominal injury and that those accompanied by a wound of a hollow viscus are very fatal. Sir Cuthbert Wallace found that only 7 out of 28 such cases in his collected series were evacuated to the base; Gask and Wilkinson saved only 3 out of 13 such cases. Some, it is true, were more fortunate, for Lockwood had 8 successful cases out of 20, and I have a record of 11 recoveries out of 22 cases of hollow viscus injury, of which several were complicated intestinal lesions.

Wounds of entry may be even still more remote from the abdomen and have been encountered in the supraclavicular fossa or as far down the lower limb as the region of the patella; it may be pointed out here that these "longitudinal wounds" are very fatal in character.

It should be borne in mind that the bowel may be damaged by small bony spicules being driven through the peritoneum, although the projectile itself does not penetrate that membrane; and non-penetrating wounds may also jeopardize life, the intestine being ruptured by indirect violence without any penetration of the coelom by the missile. Such cases are very familiar to all who have had first-hand experience of gunshot wounds of abdomen in the recent war. The small bowel in these "burst" wounds gives way either into the mesentery or along the antimesenteric border; the large bowel bursts more frequently between the taeniae coli and often behind the peritoneum, occasioning a fatal retroperitoneal cellulitis or diffuse peritonitis, as has been shown by Hamilton Drummond. It must be remembered that the mere fact of penetration, apart from the presence of any intestinal or visceral lesion, is in itself a serious menace to life, since infection of the abdominal cavity may occur from the wound of entry, and a fatal peritonitis may ensue.

What symptoms and signs enable us to make a diagnosis of intestinal injury in these less obvious cases of abdominal wounds? Rigidity, pain and tenderness, vomiting, the

facial expression and a rising pulse are all suggestive. No one sign or symptom individually is diagnostic, but when they are present in combination the clinical picture becomes more clear. An *x*-ray examination will give valuable information as to the direction of a wound of gunshot origin; and will, in addition, furnish useful suggestions as to the exact mode of approach to be adopted in the particular case.

In the abdomen there are no insignificant wounds. Every wound, whether penetrating or not, should be thoroughly explored, excised, and disinfected. What matter if an operation is perhaps occasionally unnecessarily performed! In these days of improved resuscitation and operative technique, the patient will suffer no detriment from the exploration; nay, rather, with the excision of his parietal wound his convalescence will be more sure, his wound will heal more kindly, and the surgeon will have that comfort which comes of assurance that no intraperitoneal injury has been overlooked.

Treatment of Penetrating Injuries of the Intestine.

It was counselled, even before the war, that bowel resection should be adopted only when simple suture seemed impossible. The enormous experience of both methods of treatment during the years 1915 to 1918 appears to strongly favour the minor operative procedure, save when the bowel is practically destroyed, when there are several severe injuries or complete divisions close together, when there is infarction of vessels or extensive damage to the mesentery or separation of the bowel from the latter for more than an inch or two. It is a matter of some surprise that whereas in most regions of the body the tendency of the surgery of gunshot injuries was towards wider excision of damaged tissue, yet in the case of bowel lesions more conservative surgery yielded better results. The gradual trend of surgery of the intestinal tract during the latter years of the war was towards a reparative operation of suture of the various perforations and was opposed to bowel resection.

It is true that resection eradicates at one sweep all damaged tissue, and, at its inception during the late campaign, intestinal surgery, in a high proportion of cases, consisted of excision. Owen Richards, who did so much in the First Army to put abdominal surgery on a sound footing, urged in his early writings the necessity of wide resection, advising the extirpation not only of the injured segment, but also of such portions as were likely to remain out of action and constitute a functional obstruction, just as Barker had urged in cases of strangulated hernia years before; by 1918, however, he sums up strongly in favour of suture, and states that the mortality of resection is about double that of repair.

Writing in 1917, John Fraser of Edinburgh and Hamilton Drummond of Newcastle, who admitted that in their earlier work they had a bias in favour of resection, strongly advocated suture wherever possible; in 38 cases of resection they had but 8 recoveries—a recovery rate of only 20 per cent.—whereas nearly 50 per cent. of their cases of suture did well.

Walters of Bristol and his colleagues during the first battle of the Somme also found that the mortality from bowel resection for cases of gunshot injury was double that of suture, and they urged that resection should seldom be done, especially if it was merely undertaken to save time. Lockwood and his colleagues arrived at a similar decision and concluded that resection in itself definitely increases the gravity of the prognosis.

On the contrary, F. Gordon Bell of Edinburgh, quoting also his Somme results of 1916, obtained a 46 per cent. recovery rate in a series of 30 intestinal resections.

It is interesting to note that whereas in 1916 Walters and his colleagues resected about half their cases, the ratio of the cases treated by suture to those treated by excision by the different surgeons in the casualty clearing zone in the last two years of the war was about 4 or even 5 to 1. Charles of Ipswich, for example, resected but one-sixth of his intestinal injuries, and Gordon Bell in his later series of resections in 1917–18 had a much higher mortality rate, presumably because the more severe operation was reserved for only the more severe type of case. It is, however, necessary to look sanely upon severe intestinal injury; it is useless to cobble a piece of bowel in which the life has been crushed out, which has been badly bruised, or which has been widely detached from its mesentery and its blood supply, merely because the mortality of resection is reputed to be double that of suture.

The writer has unhappy recollections of at least one case where he had sutured a badly damaged bowel and repaired the mesentery, which had been riddled with wounds. The boy had been rescued from the resuscitation ward, then apparently died on the operating table, and was revived by the transfusion of 1,000 c.cm. of blood, which reached his veins some four minutes after his abdominal aorta had ceased to beat. His desperate condition prompted the less radical operation, but he died some four or five days later of an infarct of his liver, and except for a septic thrombus in his mesentery in the neighbourhood of a perforation, no lesion was found *post mortem* which was not undergoing natural and healthy repair. A resection of bowel and mesentery at the original operation instead of the minor measure would doubtless have saved his life.

Wounds of the Large Intestine.

As in the case of the small bowel, suture should always be preferred to resection, unless the latter is inevitable. The whole experience of the surgery of the war demonstrated that suture suffices in an overwhelming majority of cases of injury to the colon; by reason of the size of this portion of the intestinal tract its wounds are mostly of the nature of perforations or tears, and the bowel is rarely completely divided. Moreover, the absence of numerous loops and coils makes multiplicity of wounds of the colon uncommon when compared with their frequency in the small intestine.

It is important to bear in mind the extreme probability of the wound of the colon or rectum being of a perforating nature, and it behoves the surgeon to satisfy himself as to the existence of a retroperitoneal wound in addition to the more obvious and accessible peritoneal injury of the large bowel. These retroperitoneal injuries, with consequent infection of the subperitoneal tissues, are much more fatal than intraperitoneal wounds. The term "colon septicaemia" was applied by John Fraser to a group of symptoms indicative of an intensely rapid septicaemia, which was met with in the case of wounds of the colon with spread of infection to the retroperitoneal space; such were especially encountered in lesions of the more fixed portions of the large intestine, where no mesentery was present. Those wounds ran a sinister course, because the tissues behind the coelomic cavity had not those powers of dealing with organisms, and especially anaerobes, possessed by the omentum and the peritoneum, because the retroperitoneal space, when infiltrated with blood, provided an ideal pabulum for the spread of infection, because the injuries of the bowel were difficult of exposure and held suture badly, and because it was difficult in some cases, especially in rectal wounds, to establish adequate drainage.

As a means of preventing fatal infection of the retroperitoneal space a colostomy may prove a most valuable operative measure, but it must be employed at a very early period before infection has actually obtained hold of the lethal cellular tissues behind the peritoneum, and it must not be used as an alternative to the establishment of free and adequate local drainage.

There are certain cases of gunshot injury of the large bowel where a resection of the damaged portion is always indicated, more especially when infarction is present. Further, in some cases where the wound of the large intestine has been of such magnitude or difficulty of approach as to suggest the formation of an artificial anus, recourse might well be made to resection, when the high mortality of the colon anus in the late war is borne in mind; the adoption of this procedure would, of course, be influenced by the general condition of the patient. If excision is to be practised the removal should be free, and the bowel sections planned in accordance with the dictates of general surgical experience. The wide removal of damaged bowel and of the adjacent devitalized retroperitoneal tissue, which the resection facilitates, finds justification not only in being in accordance with the ordinary rules for the treatment of gunshot wounds by excision of the damaged area, but also by the end-results in those cases in which this more drastic operation has been undertaken. A temporary or provisional caecostomy has proved of inestimable value in my hands in these large intestine resections.

It is appropriate on this occasion to make mention of the gangrenous ulceration of the mucous membrane of the more fixed parts of the large bowel, to which Hamilton Drummond and Shaw Dunn first drew attention. This very rapid gangrene of the mucous membrane seems to be caused by the deprivation of its blood supply through rupture of the small vessels and laceration of the underlying muscular coat of the bowel, produced by a missile the actual track of which may be separated some distance from the intestine. In these "bursting" or traction injuries the gangrene of the bowel leads almost at once to a severe infection of the retroperitoneal space, and a colostomy can be of no more service in this class of case than the performance of an enterostomy as the treatment of a gangrenous appendicitis.

It is in such wounds that heroic measures must be employed to freely expose, drain, and possibly excise the damaged area of the bowel; portions of the innominate bone or the coccyx may require removal to effect a thorough exposure of the rectum and the post-rectal tissues, and the writer has even performed an abdomino-perineal excision of rectum and sigmoid, removing coccyx, part of the sacrum and the retroperitoneal tissue, in order to get rid of the intense and fatal local sepsis.

Multiple Bowel Resections.

In pre-war surgical writings there is but little reference to multiple resections of intestine, and one generally seems left to assume that when an excision has to be done the segment removed must include the whole of the damaged area. Even Sir Berkeley Moynihan makes but the briefest reference, and merely states "on rare occasions a double or even a triple resection may be necessary."

Published results of abdominal operation for gunshot injuries and conversations with other surgeons at the casualty clearing stations gave one the impression that double resections of bowel for wounds of gunshot origin were but rarely successful, and it was generally admitted that in cases where such a procedure appeared to be indicated it was preferable to either remove one damaged segment only and make every effort to "cobble" the other by means of suture, or alternatively to extend the resection so as to include all the damaged bowel in the one portion ablated, sacrificing the intervening healthy bowel to carry into effect this principle of single excision.

Webb and Milligan thought that two feet was the amount of healthy bowel intervening between two segments requiring removal which might be sacrificed so as to make the resection a single one. On the other hand, if the distance between the two damaged segments exceeded this, a double resection should be performed.

It follows from what has already been stated in respect of the surgical treatment of wounded bowel, that it is only the cases of very severe intestinal injury or very gross damage to the mesentery which have required such drastic measures, and it is interesting to note that in the majority of the eleven cases of double resection of intestine of my own (of which I have notes) other wounds of the bowel required repair by suture. Of these eleven cases, four recovered; the one triple resection which I performed for a bomb wound of the abdomen, though the patient was transfused with blood, died of his injuries, which included an enormous wound of the liver and diaphragm, a prolapsed and shattered transverse colon and jejunum, and other wounds involving the sigmoid and gall bladder.

Poppert is quoted by v. Mickulicz as having performed a quintuple resection for a pistol wound of the intestine and to have saved his patient. A triple resection of small bowel was performed by W. A. Campbell of Glasgow, and of No. 37 Casualty Clearing Station; in no case did the resection amount to more than five or six inches. The patient made an absolutely uneventful recovery so far as his abdomen was concerned; the bowels moved naturally and freely, and there was never any intestinal paresis. But the cold and damp weather during the latter part of the advance in the autumn of 1918 proved too much for the patient, who developed pneumonia and rapidly succumbed.

Successful multiple resections of bowel under civil conditions, and more especially in non-traumatic surgery, do not appear to be remarkable; Sir John Bland-Sutton tells me that he has probably had half a dozen such, and I have had a successful triple resection which survived the removal of some 2 ft. of jejunum and two segments of large intestine in the course of extirpating a large inflammatory tumour in the umbilical region. Ernest Hunt, of Worcester, U.S.A., had a successful triple resection for a bullet wound which involved the removal of 21 in. of lower jejunum and two segments of ileum. Most of the successful results of double resection have involved the ablation of but short segments of bowel, but in one of my own 4 ft. of jejunum and 2½ ft. of lower ileum were successfully excised.

In the War Museum of the Royal College of Surgeons is a specimen of a double resection which ended happily, and successful cases are recorded by Shaw, by Meyer and D. C. Taylor, and by C. H. S. Webb. My friend and colleague Victor Bonney had a "late" double resection for a gunshot wound at the Middlesex War Hospital at Clacton, and this case also ended happily.

The high mortality of double-bowel resection is doubtless due to the serious injuries which necessitate such a severe operation, and is unconnected with the actual nature of the operation itself. In no successful case of my own was the post-operative history characterized by any condition of ileus or any intestinal obstructive phenomenon, nor was any such demonstrable in the fatal cases at autopsy.

Other Factors Influencing the Results of Treatment.

Time and space are wanting to deal with every aspect of the treatment of intestinal injuries due to penetrating wounds, but a few further points may perhaps be emphasized.

The fatality of wounds of the duodenum was notorious in the late war, but cases did recover, and Professor Saint, of Capetown, had a successful case of abdomino-thoracic wound involving the hepatic flexure and the second part of the duodenum, which was produced by a fragment of shell weighing two ounces. According to Sir Cuthbert Wallace, wounds of the jejunum had a better prognosis than those of the ileum.

Associated injuries to other abdominal viscera naturally increase the gravity of intestinal wounds. The pancreas had a very sinister reputation in this respect; but at least one patient of my own, a stalwart Australian, wounded on Mount St. Quentin in 1918, survived a suture of twelve wounds of his ileum, the resection of 18 inches of the lower jejunum, and a severe wound of the pancreas with extensive fat necrosis present all over the omentum and mesentery.

The "early" mortality amongst combined bowel and bladder injuries was very high; it is said to have been "dismal in the extreme," yet of those who survived to reach the French base 70 per cent. recovered. Isolated successes remain indelibly fixed in one's mind: Gordon Bell's successful resection of 5 ft. of small intestine and the suture of bladder and rectum, D. C. Taylor's 4 ft. resection of small bowel and removal of a fragment of shell from the bladder, and my own case of extraperitoneal wound of the rectum, extra- and intra-peritoneal wounds of the bladder, and a 3½ ft. resection of small bowel, including a damaged Meckel's diverticulum, are "the exceptions which serve to prove the rule."

The prognosis in cases of evisceration from gunshot injuries to the abdomen is extremely serious; nevertheless, extraordinary successes have been seen by individual surgeons as the result of their treatment. Bayonet wounds involving the intestinal canal are usually fatal on the field, but the writer has had one successful case of a bayonet wound of the rectum and sigmoid, and a damaged sigmoid artery which had bled very freely. The few stab wounds which have come under my notice in civil surgery have been treated by an exploration through the wound, which has been appropriately enlarged after thorough disinfection or excision. This affords a satisfactory access to the damaged bowel, which is usually in the near vicinity of the puncture, in contradistinction to gunshot wounds which are best approached through a median or a paramedian incision, in order to explore adequately the coelomic cavity for possible intestinal injuries.

Anoci-association.

For the past nine years I have counted myself an adherent of the sect who profess the doctrine of the kinetic theory of shock and of its prevention through anoci-association, and I have embraced many, if not all, the tenets of that school. I am convinced that whether combined with nitrous oxide and oxygen or with warm ether

vapour inhalation, local anaesthesia of the abdominal wall by means of novocain solutions is a most valuable measure and facilitates abdominal operative procedures.

Blood Transfusion.

In blood transfusion we have the most potent means of treating the shock-haemorrhage combination which is such a feature of intestinal wounds, especially those due to penetrating injuries. Its value was amply proved in the late war. A series of 34 abdominal cases of my own with pulse rates of over 120, treated with blood transfusion and operation, showed 14 recoveries (41 per cent. recovery rate), and still another series of mine of 32 cases with pulses of 140 and upwards, transfused and operated, gave 12 recoveries (37.5 per cent. recovery rate). The results in this series of desperate abdominal injuries may be fortuitous; nevertheless, they may be contrasted with some of the figures published before transfusion became such a relatively common practice in the casualty clearing zone. In June, 1917, it is said, "of 145 cases with pulses over 120 only 16 recovered, a recovery rate of but 11 per cent."; and another well-known surgeon in the early part of the war strongly urged "against any operation in a man with a pulse over 140."

In the late war blood transfusion and the anoci-association operation rescued many almost moribund abdominal cases, and these measures should be employed in severe intestinal injuries, whether due to contusions or to penetrating wounds inflicted by accident or design.

II.—James Berry, F.R.C.S.,

Consulting Surgeon, Royal Free Hospital, London.

Mr. Gordon-Taylor has dealt so well and so fully with the subject of ruptured intestine accompanied by external injury that I propose, in the short time at my disposal, to limit myself to a few points in connexion with traumatic rupture without external wound, which in civil practice is the more important subject of the two.

Much has been written upon the manner in which such injuries are produced. Of the three alleged causes—crush, tear, and bursting—there is, in my opinion, but little doubt that by far the most common and important is direct crush between some hard substance and the lumbar spine, or, less often, the innominate bone. Tearing occurs mostly at or near the duodeno-jejunal junction, and is quite a rare cause of rupture. Bursting is little more than a pathological curiosity. It may occur occasionally in the case of a blow upon a hernia. It occurs also in those rare cases in which air is forced at high pressure into the rectum (chiefly American cases of so-called pneumatic rupture). The site of the rupture is shown in the accompanying table, comprising the statistics of three large series of hospital records, excluding all isolated cases collected from literature, which are notoriously somewhat misleading.

Table I.—*Site of Rupture in 221 Cases of Rupture of Intestine without External Wound.*

	10 London Hospitals (1893-1907).*	12 London Hospitals (1908-1912).†	Zeidler's Clinic at Petrograd (1897-1910).‡	Total.
Duodenum ...	23	5	1	29
Jejunum and ileum	92	37	48	177
Large intestine ...	10	2	3	15

* Berry and Giuseppi, *Proc. Roy. Soc. Med.*, November, 1908.
† Cope and Raymond Johnson, *Proc. Roy. Soc. Med.*, January, 1914.
‡ Tschistosserdorff, *Beitr. z. klin. Chir.*, 1912, vol. 79.

Personal observation of more than twenty cases and the study of the clinical records of some hundreds of collected cases has convinced me that the diagnosis could and should be made earlier than it often is. If we are to get better results in the future than many of us have had in the past, it can only be by making a very early diagnosis and following this up by prompt operative treatment. Especially must we disabuse our minds of the still too common idea that abdominal distension and evidence of free gas in the abdomen must be present before rupture of the intestine can be diagnosed. After all, as Dr. Giuseppi and I wrote in 1908: "The important question to be decided is usually not so much, 'Is there a rupture of the intestine?' but 'Is there an abdominal lesion sufficiently grave to demand an immediate abdominal section?'"

I am far from recommending immediate operation in all cases of abdominal contusion. The great majority of such cases recover without operation. But a blow upon the abdomen, followed by severe and continuous localized pain and marked local tenderness, indicates almost always rupture of the intestine. These symptoms alone are usually sufficient to demand exploration, especially if muscular rigidity be present as well. Vomiting often occurs, but is not essential for the diagnosis. At this stage, the most favourable for operation, the pulse rate is often normal. A little later the pulse rate rises owing to absorption from the peritoneal surface or from cellular tissue.

At this stage, if no distension has occurred, operation still has a good chance of success. Later still, with much abdominal distension, the chances of successful operation are greatly diminished. When absence of liver dullness and marked signs of general septic absorption have set in, operation is usually wellnigh hopeless. And here I would say that general practitioners who see these cases early and do their own operations have a great advantage over hospital surgeons, who are largely dependent upon resident medical officers and are often not summoned until the most favourable time for operating has already passed away.

Rupture of the intestine, *per se*, does not necessarily produce shock. Shock is often present, but is generally due either to concomitant injuries such as damage to the solar plexus or to other abdominal organs, or, rarely, to the sudden escape of large quantities of intestinal contents. A rupture of the intestine is not usually attended in the first few hours after the accident by the escape of any considerable quantity of gas or other intestinal contents.

It has been shown both by experiments on animals[1] and by clinical observation that the immediate effect of a severe injury to the intestine is usually a contraction of the bowel in the immediate neighbourhood of the lesion. This contraction tends, for a time at least, to prevent further extravasation. That it may sometimes last for many hours was shown to me by the case of a Russian soldier under my care during the battle of Marasesti in Rumania in 1917.

I found this man at a dressing station near the battlefield thirteen hours after he had sustained a bullet wound causing five perforations of the small intestine, varying in size from that of a halfpenny downwards. When I opened the abdomen, less than an hour later, the wounded portions of intestine were found glued together, forming a mass as large as a double fist. On drawing this mass out of the abdomen it was seen that the intestine immediately above the perforated area was still tightly contracted for a distance of five or six inches. It then suddenly relaxed, and a great stream of intestinal contents poured out on to the table. Had this relaxation occurred before the abdomen was opened the man would have had little or no chance of recovery. The holes were all closed by suture, nothing whatever was given by mouth for four or five days, and the man was sent back convalescent to the base between two and three weeks later.

Clinically, cases of ruptured intestine without external wound generally present themselves under one or other of three different aspects:

1. Cases of localized primary rupture involving all coats of the bowel. These cases are common, and include most cases of kicks, blow and falls against hard substances. Most of these could be diagnosed very early from (*a*) the history of the injury (not necessarily severe, and sometimes apparently trivial), (*b*) severe local pain with sharply localized tenderness and muscular rigidity. Vomiting frequently occurs, but is not essential for diagnosis. These cases should be operated upon immediately without waiting for rapidity of pulse, distension, presence of gas or fluid in the abdomen, or absence of liver dullness. Yet hospital records show that these latter are the symptoms upon which many hospital residents and some surgeons seem to rely.

2. Cases of secondary rupture (lumen of bowel at first not completely perforated and with no extravasation of intestinal contents into the peritoneal cavity). Symptoms are usually not so characteristic until perforation occurs secondarily. These are the cases which often walk to

hospital and are apt to be sent away as trivial injuries. I have personal knowledge of several such cases. Here is one: A boy received a blow upon the abdomen and walked to the nearest hospital. He had so little pain and seemed so well that he was allowed to go home. He proceeded to eat a good supper, but immediately afterwards he was seized with severe pain in the abdomen and other signs of intestinal perforation. He was taken to another hospital where he shortly afterwards died. At the necropsy an extensive rupture of the duodenum was found. The peritoneal coat was much less extensively ruptured than the others, and had evidently given way secondarily.

3. Cases complicated with other internal injuries, including most of the "run-over" cases. These are generally very severe, and often attended with much shock. They are generally difficult to diagnose accurately. In these the surgeon has to separate the symptoms which are due to rupture of the intestine from those due to other conditions, such as haemorrhage, rupture of pancreas, liver, etc. Not only may diagnosis before operation be a matter of much difficulty, but at the operation itself the rupture may easily be overlooked owing to the presence of much blood in the abdomen, the signs of the intestinal lesion being overshadowed by those of some more obvious gross lesion. Among the 84 operation cases recorded by Dr. Giuseppi and myself, there were no less than 15 in which the rupture of the intestine was overlooked at the time of operation. Many of these were ruptures of the duodenum.

Summary of Treatment.

To be successful, operation must be undertaken early—within the first few hours of the accident. Early diagnosis, based upon a few characteristic signs and symptoms, is essential. At the operation a sufficiently long incision should be made. The wounded bowel will usually be found immediately below that point on the surface at which the blow was inflicted, or between this and the lumbar spine. Simple suture is generally better than resection. Local sponging is better than irrigation. Drainage can often be avoided, but when in doubt, it is best to drain suprapubically for a short period. The after-treatment should be to sit the patient up, give nothing at all by the mouth for four or five days, and administer continuous rectal saline by the drop method for many hours.

TABLE II.—*Results of Operation for Rupture of Intestine without External Wound.*

	10 London Hospitals (1893-1907).	12 London Hospitals (1908-1912).	Zeidler's Clinic at Petrograd (1897-1910).
Cases admitted	132	44	52*
Cases operated upon	84	30	49†
Recoveries after operation	17	9	8
Percentage of recoveries after operation	20.2%	30%	16.3%

*None of these were "run-over" cases.
†Of these 49, 10 were operated on within six hours, and 5 recovered; of those operated upon after twenty-four hours, none recovered.

Probability of Cure.

Careful examination of the details of the cases recorded in the above table appears to bring out clearly the fact that the probability of cure by operation in uncomplicated cases of primary rupture varies inversely with (1) the number of hours between accident and operation, and (2) the amount of extravasation of intestinal contents, which is usually, in the first few hours, not great, owing to spontaneous intestinal contraction.

Some statistics appear to show that operation performed from seven to twelve hours after the injury are more likely to end in recovery than those performed in the first six hours, and this has recently been used as an argument for some delay. But as Dr. Giuseppi and I pointed out in our original paper, there is a fallacy in this, because many of the most severe and complicated cases in which the necessity for operation admits of no doubt would be operated upon early, while many of the slighter cases with but little extravasation, and cases of secondary rupture, are often watched for hours before operation is undertaken.

Conclusion.

In conclusion, I should like to show, as illustrating my remarks, a sketch from a specimen in the Royal College of Surgeons of England (by kind permission of Professor Sir Arthur Keith). It depicts a specimen (R.C.S. Museum, No. 2,435) which is quite characteristic of the commonest form of rupture of the intestine, and is of historic interest as well, since the injury was inflicted exactly one hundred years ago.

External surface of jejunum, showing small complete rupture of all coats with protrusion of mucous membrane. Natural size. Museum, Royal College of Surgeons, No. 2,435.

It is described thus in the catalogue: "A portion of jejunum, the coats of which were ruptured by a blow. The aperture is transverse and oval, measuring about a quarter of an inch in its greatest diameter. The edges of the ruptured mucous membrane are protruded through the aperture in the peritoneal coat and everted, so as to form a deep border round its margin, by which the apparent extent of the aperture is considerably lessened. The adjacent peritoneal coat is thinly covered by lymph."

The following is a transcript of the original notes published by Mr. Joseph Swan, surgeon of Lincoln, in the *Edinburgh Surgical and Medical Journal* for 1824, vol. xxii, p. 93:

"*Case of Rupture of the Jejunum.*

"John Copaldish, aet. about 70, was kicked by a horse just above the navel, on the 24th of April, 1821, at one p.m. He was very faint for some time and in extreme pain. He was bled, and had his body fomented; he took an opiate, and had a clyster. He was *in great pain always at the spot* where he was injured. There was a little discoloration, as from a slight bruise, but there was not the least wound. The abdomen became tense about two hours after the accident, and so tender as not to bear being touched. He died at ten a.m. on the 25th. He was *able to retain some gruel* and other mild things on his stomach, and he *never vomited* after the accident. The clyster purged him well, and passed plenty of urine.

"*Examination.*—There was a small opening in the lower part of the jejunum, and the lips of the wound were everted; the whole of the small intestines near the injured part were inflamed, so that coagulable lymph was effused, by which several folds were glued together. The villous coat was not inflamed. The whole peritoneum was becoming inflamed; but the omentum was in a high state of inflammation, and adhered to the intestines. There was a large quantity of bloody serum in the abdomen, but *very little feculent matter had escaped*. On two portions of the intestine there was a black patch of the size of a shilling, which was only an ecchymosis."

This case is a very typical one as regards both history of the injury and subsequent symptoms (severe local pain from the beginning and local tenderness). It also illustrates the bad treatment (according to modern ideas) often adopted by patient and others—namely, food by the mouth, opium before diagnosis, and no early operation.

In conclusion I should like to express the debt of gratitude we all owe to successive surgeons of St. Thomas's Hospital—especially Mr. Croft, Sir George Makins, and Mr. W. H. Battle—for all that they have taught us about the diagnosis and treatment of rupture of the intestine.

REFERENCE.

[1] Dambrin, *Lésions de l'intestin*, Thesis, Paris, 1903.

DISCUSSION.

Mr. Zachary Cope (London) said: Mr. Gordon-Taylor has dealt so fully with the question of penetrating wounds of the intestine, and Mr. Berry has considered so judicially the problem of non-penetrating injuries, that I can add little to their able contributions.

I find myself in complete agreement with the wise counsel of Mr. Gordon-Taylor, especially with regard to his statement that every wound of the abdomen is serious or should be regarded as such until proved otherwise. Wounds of the abdominal wall, even small and apparently superficial lesions, need the most careful attention. They should not be investigated by the probe, which is an instrument unnecessary, if not harmful, in the conduct of abdominal wounds. Such injuries should be thoroughly examined under an anaesthetic, the edges of the wound either excised or suitably cleansed, and the presence or absence of any lesion of the peritoneum determined. If the peritoneum be penetrated, the further abdominal exploration is a matter of course.

The question of treatment of a non-penetrating abdominal injury resolves itself into a matter of diagnosis. If there be any symptom present which in any way points to or is suggestive of serious intra-abdominal lesion—especially of the intestine—then operation is indicated. It is unfortunately true that there is no one symptom or sign which constantly proclaims the presence of intestinal injury. There are two indications, however, at least one of which always serves to point to the peritonitis which sooner or later supervenes on a rupture of the intestine. The first is persistent pain, the second progressive change in the pulse.

The pain is shown in four ways: The facial expression may betray it, superficial or deep pressure on a certain area of the abdominal wall may elicit it, or the patient may openly and spontaneously complain. Finally, rectal examination may show that the pelvic peritoneum is tender. Importance must also be attached to any shifting of the site of the pain. An epigastric blow followed by hypogastric pain is very suggestive of a ruptured viscus.

In those very few cases in which pain is not complained of or easily elicited there are usually changes in the pulse, either a progressive increase in rate or decrease in force, or both combined. I am well aware that many cases of ruptured intestine present a normal pulse at the time of examination, nor should the surgeon wait for change in the pulse if there be any other symptoms suggestive of gut injury. If pain be accompanied by vomiting the indications for operation are clear. It is necessary to bear in mind that an attack of appendicitis sometimes appears to be precipitated by a blow on the abdomen, but in such a case the symptoms are in no way peculiar.

The symptom termed by Tschistosserdorff "primary meteorism" may occasionally be puzzling. It is especially after retroperitoneal injuries that there may follow an alarming distension of the intestines which may suggest peritonitis. In these cases the pain will be less and the condition of the pulse more normal than in cases of intestinal injury. A perfectly placid countenance is seldom seen accompanying peritonitis.

No one in this discussion has referred to those cases of rupture of the colon consequent on the application of the nozzle of a high-pressure air apparatus to the anal region. Several cases have been recorded in the United States in which the colon has been torn to ribbons by the enormous pressure of the gas which entered the anal canal. This should be an avoidable accident if strict warnings were issued to all the workers of such apparatus.

Mr. Berry misunderstood what I intended to convey if he thought that I would always wait six hours even when the symptoms of intestinal injury were present. I should operate so soon as I had made up my mind that there was a possibility of any intestinal rupture. But many patients for one reason or another do not reach the surgeon for several hours after the accident. The rules that I laid down for guidance referred particularly to such cases.

With regard to the value of liver dullness in diagnosis I agree that one should never wait for the liver dullness to disappear, yet the case need not be hopeless even when resonance be obtained over the liver. I have succeeded in saving a patient who had such a condition.

The prognosis in cases of intestinal rupture without external injury used to be very grave, with a mortality of 30 to 50 per cent. I believe that with earlier diagnosis and more prompt surgical intervention the outlook will be much more promising. The experience at St. Mary's Hospital would seem to support that view, since the last five cases (operated on by four different surgeons) have recovered from the condition.

Mr. Hamilton Barclay (Newcastle) recommended, with regard to penetrating wounds—for example, gunshot wounds—that median or paramedian incision should be a rule. There ought to be a systematic search of the viscera after opening the abdomen in order to avoid missing lesions, and all the lesions should be found and investigated before dealing with any single lesion. Haemorrhage should be dealt with first of all. Other important points were gentleness and avoidance of undue evisceration of the intestine during the operation. With regard to contusions, in doubtful cases where there was a real possibility of ruptured intestine, the abdomen should be explored rather than wait.

The President of the Section (Professor Rutherford Morison) said that the most important point in the problem of the treatment of intestinal injuries was the education of the practitioner. What they wanted to do from the Surgical Section was to send out rules for the practitioner which he could observe when he met with such cases. He always reminded his students of a case which came under his notice which was accurately reported, and which created great interest at the time: A prominent footballer was struck on the abdomen forcibly by the knee of an opponent; he collapsed, and was carried into the pavilion, a doctor was sent for, saw him, and said he was only "winded" and would be all right. Apparently the man was soon better, and he was taken home in a taxicab. This occurrence was on a Saturday afternoon; he was seen at home on the following day, and everything seemed well, but on the Thursday following—that is, five days after the injury—he was dead. A *post-mortem* examination was held, and a rupture of the jejunum, close to its junction with the duodenum, was discovered. Now this case was typical of all these abdominal conditions.

There was only one point on which he did not agree with Mr. Berry, and that was that in all these cases there was some shock. What is shock, and what is not shock, was a difficult problem. The patients' appearance was bad; sometimes they were so cold and so feeble and so ill that everyone could recognize the facts; but the shock stage might be so transient that almost nobody observed it. After the shock stage there came a reaction stage, and that was why they, as surgeons, did not get these cases so very early. The general practitioner sometimes did not recognize that a patient might appear to be almost quite well with a rupture of a viscus, stomach or intestine, or suffering from bleeding; he might appear on a superficial examination to be quite well and yet suffer any of these conditions. He had seen a man with a ruptured liver and a ruptured pancreas and yet with such an excellent reaction from shock that those who saw him regarded him as only "winded" for the moment. The three important and common stages were: the period of shock, the period of reaction, the period of haemorrhage, peritonitis, or whatever gross lesion was present. His next point was as to the importance of the history of the case, and he strongly advocated accurate information being conveyed to the surgeon in charge. If a man got a sudden serious blow—a kick of a horse, a blow with a shaft of a vehicle—almost certainly they would find ruptured intestine. How were they to get those cases early into hospital? Every speaker had emphasized the importance of diagnosis and early treatment, and he had emphasized the difficulties in doubtful cases. The practitioner had only one course: if a man was kicked or otherwise injured in the abdomen, and even if he could see no urgent symptoms, every such person who had a severe localized injury, whether he appeared to be ill or not when seen by the practitioner, should be sent to a hospital straight away for observation.

Mr. F. J. S. Heaney (Liverpool) mentioned a case in which he had found rupture fourteen hours after injury,

and in which he had had to operate twice subsequently for intestinal obstruction. He had some difficulty in understanding such recurring adhesions.

Mr. D. P. D. Wilkie (Edinburgh) asked what was the attitude of the surgeon to the cases sent into hospital. It was difficult for the surgeon to say whether there was injury to the viscus or not. Wherever there was a lesion about they ought to explore the abdomen. Surgeons had frequently been surprised to find extensive lesions where apparently nothing was to be expected. He mentioned a case where a footballer was kept under observation for three days and demonstrated to students, but on the fourth day was operated upon and found to be suffering from a very complete rupture of the jejunum. He was impressed with the practical impossibility of stating whether the patient had a definite rupture or not, and he thought that such cases should not be left for prolonged observation.

Mr. Ernest Finch (Sheffield) laid stress upon the slight extent of injury necessary to produce a rupture of intestine. He quoted a case of a man, aged 21, who slipped off a curbstone at 4 p.m., and afterwards complained of pain, but was able to get home. He vomited and was seen by his doctor, who diagnosed appendicitis. At 11 p.m. the following day, over thirty hours after the accident, the condition was diagnosed as a rupture of intestine. He was operated upon and recovered. The mild extent of the symptoms was also of great importance. The symptoms were not always such as would even draw attention to the possibility of an injury to the intestine.

A boy had a contusion of the abdomen and was seen almost immediately. He had a slight degree of shock, but beyond that nothing could be elicited, and he was left. Ten hours after the accident he suddenly became extremely collapsed, complained of intense pain, vomited, and in less than one hour died. At the autopsy he was found to have an almost complete rupture of the jejunum high up, and the amount of intestinal contents free in the peritoneal cavity was about one ounce.

In all probability the original injury caused a paralysis of the gut; with gradual recovery the first peristaltic wave down the gut forced out the contents and death resulted from the shock. A type of injury not mentioned by previous speakers was injury from within. The intestine can be ruptured by foreign bodies, pus, rabbit bones, etc., from within the lumen of the gut. They can give rise to most acute symptoms; in one case the speaker mentioned the condition was diagnosed as intussusception, and in the other as acute infection of the gall bladder. In both these cases a rabbit bone had perforated the transverse colon; both cases recovered.

These cases illustrated the following points: The slight extent of the accident necessary to produce a ruptured intestine, the immense importance of pain, and the advisability of operating early rather than waiting for symptoms to make the diagnosis certain; but there was always a possibility of recovery even after thirty hours.

Mr. C. Firmin Cuthbert (Gloucester) said that he would like to refer to two cases of severe abdominal trouble produced by comparatively slight injury:

1. A gentleman fell across a pipe over a ditch when on special constable duty at night. He lay in great pain for some hours, and was then found and taken into the guard-room. He went home and put himself to bed. He had pain during the day. When seen, at 10.30 p.m., he had localized pain and localized tenderness over the epigastrium, no rise of pulse. With difficulty of persuasion he was removed to a nursing home and the abdomen opened up. A considerable bruising of the jejunum close to the duodeno-jejunal angle was found, with part of the omentum bent over the bruised area. He made an uneventful recovery.
2. The other case, although not strictly one of intestine injury, was a boy of ten who was playing leap-frog. When just about to jump, the other boy straightened up his back and the jumping boy struck his abdomen against him. He had intense pain and shock, and soon presented a blanched appearance. Within an hour his abdomen was opened and found full of blood, caused by a transverse tear of the spleen. Splenectomy was done, which microscopically showed no previous disease of the spleen.

These cases emphasize the necessity of immediate operation in comparatively minor abdominal contusions.

Mr. C. P. Childe (Portsmouth) was interested in the length of intestine which was capable of removal. He quoted the case of a woman, 61 years of age, who suffered extensive gangrene of the bowel due to thrombosis of a mesenteric vessel, who had had 7½ feet of bowel excised, and who died nine months later from malnutrition. He thought, on the whole, it was unsafe to remove so much bowel.

Mr. F. A. Hadley (Perth, Western Australia) mentioned a case of slight injury where a patient had simply struck himself on the abdomen with a small parcel consisting of two books, without actually falling, in whom a small perforation was found about 2 feet above the ileo-caecal valve.

Mr. H. S. Souttar (London) said: For the successful surgical treatment of intestinal wounds perfect conditions for operation and after-treatment were essential. In wounds of the colon complicated by injuries to a kidney or the spine an ileo-sigmoidostomy would sometimes be very valuable.

Mr. Gordon-Taylor, in reply, referred to Mr. Berry's interesting case of the Russian soldier, where he had found that even fourteen hours after injury no extravasation had taken place, on account of the contracted condition of the bowel at the seat of injury. He was greatly indebted to Professor Rutherford Morison for his remarks, and agreed that it was of greatest importance that every contusion of the abdomen should be seen by the surgeon or sent at once to hospital. The longest resection for traumatic lesion he had seen successfully performed was a resection of 6 ft. 6 in. of bowel. He had resected 7 ft. 6in. of bowel in thrombosis of the mesenteric vessel of the bowel, and this case did very well; he also had one other case of resection of 9 ft. of bowel in an old lady who lived for two years afterwards. In regard to treatment he was fully in sympathy with the necessity for full control of materials given to the patient, and he felt certain that if the patient were content to limit himself to water only he would do well, but if, through mistaken kindness, he got food, he would almost invariably do badly.

Mr. James Berry, in reply, said that he was not perhaps so far from disagreeing with Mr. Cope as appeared. In regard to waiting for six hours, he meant that the surgeon would do so only for the purpose of overcoming temporary shock; therefore he thought that it was not wise to wait for such a sign as the absence of liver dullness. There was shock in practically every case, but when the patient came to hospital, when first seen by the surgeon, there might not be evidences of shock, and he thought that it was because of the teaching that there was always shock that mistakes were made.

THE EMPLOYMENT OF CRUSHING INSTRUMENTS AND THE CAUTERY IN CERTAIN INTRA-ABDOMINAL OPERATIONS;

With Demonstration of some Special Instruments.

By

Charles P. Childe, B.A., F.R.C.S.,

Senior Honorary Surgeon, Royal Portsmouth Hospital.

As far as operative work on the stomach or intestine is concerned—for instance, gastrectomy or enterectomy—for tumour, valvules, stasis, etc., the method I am about to describe involves closure of the cut ends of the stomach or bowel and lateral anastomosis. Cases, of course, arise where it is desirable and even compulsory to perform end-to-end union, and some surgeons practise this method as a routine. Though in cases in which I have been compelled to adopt this method I must say that results have generally been satisfactory, I have always considered lateral anastomosis as the operation of choice in stomach or intestinal work. It is, though not so artistic in appearance as end-to-end union, the safest way of joining the interrupted gastro-intestinal tract, the more perfect in its aseptic technique, and it obviates all difficulty which may arise from a difference in calibre of the parts requiring anastomosis. This being postulated, the matter with which this paper deals is the best method of closing the cut ends. In the case of the intestine this can always be done in the following manner.

A crushing instrument, two examples of which I have here, one invented by myself several years ago (Fig. 1), and the other (Peyr's), which I first saw employed in Vienna and generally use now, is applied to the intestine where it is intended to divide it at two points about one inch apart. After removal of the crusher the intestine is tied with a piece of silk or catgut in the two grooves made by the instrument. After inserting a piece of gauze beneath the intestine the latter is cut through with Paquelin's cautery between the ligatures, and the knob of tissue to be turned in is reduced in size with the cautery. A purse-string suture of catgut is then run loosely round the serous coat of the bowel a full inch from the cut end, so as to allow of the latter being readily tucked in, and the bowel is closed by drawing on the purse-string just as in appendicectomy.

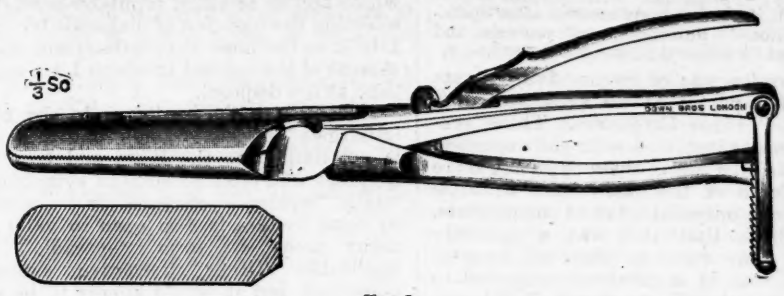


FIG. 1.

The method is absolutely aseptic and prevents any chance whatever of soiling by intestinal contents. The only infected part of the operation is the lateral anastomosis, and by a careful technique soiling during this stage can always be avoided, especially if clamps with blunt teeth which cannot slip are employed. These clamps may be applied with the absolute assurance that they never cause anything more serious than a temporary contusion of the gastric or intestinal wall at the points where the teeth grip. In gastrectomy it is not possible to tuck in and close with a purse-string suture the proximal end of the stomach. A modification is therefore necessary. The crushing instrument is applied along the line it is intended to divide. Clamps with blunt teeth are applied on either side of the crusher, and in place of the ordinary long stomach clamps I have had some smaller straight clamps made which are handy in some cases when it is difficult to apply the former. (Fig. 2.) For instance, when it is necessary to divide the stomach high up, one of these smaller clamps can be applied from below and another from above so as to completely close its proximal end, when the application of the larger clamp ordinarily used is difficult. These smaller clamps are also frequently useful and more handy in intestinal work than the larger blades which are sometimes in the way.

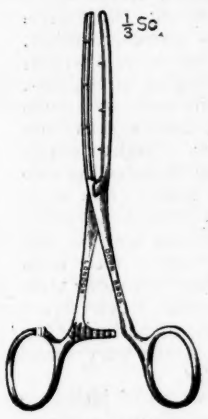


FIG. 2.

After the clamps have been applied as described above on either side of the crusher, the stomach is severed with the Paquelin cautery close against the blade on its distal side. The crusher is then removed. The crushed portion sticks together for the moment, but will very easily come apart again, and if so some contents would escape. It is therefore immediately seized with Poirier's forceps at intervals of about one inch—that is to say, three or four of these forceps are applied along the crushed line. Supported and kept closed by these, the crushed portion is then stitched up with a continuous suture of catgut. It is then very easy to apply a continuous serous suture over this thin crushed line, which readily tucks in. If the technique is properly carried out not a particle of the stomach contents should escape.

I have briefly sketched above what appears to me to be the most perfect method and technique of closing divided ends of stomach and bowel, a method which reduces to vanishing point the chief danger attending the operative procedure—namely, the spilling of gastric or intestinal contents. In closing the end of the large intestine after sacral excision of the rectum exactly the same method is adopted, and all danger of infection from this source is thereby obviated.

So many general surgeons perform Wertheim's abdominal panhysterectomy for carcinoma of the uterus that, without wishing to intrude on the preserves of the Gynaecological Section, I may perhaps be permitted to bring before you a similar procedure which for the past fifteen years I have followed in this operation. The only ligatures I employ in panhysterectomy are those for the ovarian and uterine arteries. After these have been secured, the ureters have been cleared out of the way, and the vagina separated from the bladder in front and the rectum behind, these powerful crushing clamps which I have had made are applied one on each side to the parametrium close out to the pelvic wall. You will see that they are of a size and so curved as to adapt themselves to this end. The parametrium is then cut through with scissors close to the clamp, and the wound so caused seared with Paquelin's cautery right down to the blade of the clamp. The vagina is treated in exactly the same way with a powerful crushing clamp, cut through and cauterized. After removal of the uterus and as much of the vagina as is considered advisable, the three clamps are taken off. Haemostasis is perfect, and I have never had a case of subsequent haemorrhage. No ligatures which may act as sources of irritation or infection are left at the bottom of the pelvic wound.

Wertheim's instruments, which are intended only for securing these structures preparatory to ligaturing them, have little crushing power and are unsuitable. The instruments I show you here are furnished with the requisite power, and I have stood the test of an extensive experience of this operation. The operation, moreover, done in this way is quicker, and a saving of time here means a saving of life, shock being a factor of the utmost importance. The time taken is about forty-five or fifty minutes. No vaginal drainage is employed, there being practically no vaginal discharge after the operation done in this way. I submit this as an easier, quicker and better method of performing that part of Wertheim's operation which involves the parametrium and vagina. These crushing clamps are made by Down Bros.

DEMONSTRATIONS.

ON the afternoon of July 22nd Mr. G. GREY TURNER, F.R.C.S., gave a series of demonstrations at the Royal Victoria Infirmary. The first was a demonstration of eight cases of intraperitoneal implantation of the ureter into the pelvic colon, the details of the cases being as follows:

Case 1.—Male, aged 8 years; total epispadias with incontinence. Operation in two stages—the first in December, 1912; the second, six months later. Whooping-cough occurred as a complication. The patient was cured, and is now—eight and a half years after operation—in excellent health; there is no incontinence.

Case 2.—Female, aged 22; epispadias with incontinence. Two-stage operation—the first in December, 1914; the second, three months later. Cure resulted, and the patient is now perfectly well—six and a half years after operation. She is married and has one child.

Case 3.—Male, aged 19; ectopia vesicae. Operation in March, 1917—two stages, with three weeks between. The case was complicated by intestinal obstruction. The patient was cured; he is now very well and works regularly on a farm. He has some incontinence at night.

Case 4.—Female, aged 20; epispadias. Operation in May, 1917—one stage. The case was complicated by peritonitis and pyelonephritis, resulting in death.

Case 5.—Female, aged 6; ectopia vesicae. Operation, November, 1917—two-stage, with three months between. Complicated by extraperitoneal abscess. The patient was cured, and is now, nearly four years after operation, in very good health.

Case 6.—Male, aged 13; ectopia vesicae. Operation, May, 1919—two-stage, with two months between. Complicated by peritonitis from leaking ureter. Died.

Case 7.—Male, aged 5; epispadias, with incontinence. Operation (two-stage) May, 1920. Complicated by extraperitoneal abscess with urinary fistula. The patient was cured and is now very well; the urinary fistula healed spontaneously.

Case 8.—Male, aged 13; epispadias with incontinence. Operation in January, 1921. At present, six months after operation, there is some suspicion of pulmonary tuberculosis, and the second stage is deferred on account of the chest condition.

The second demonstration was of twenty-five patients after operations for cleft palate at all ages according to the method of Sir William Fergusson. These presented no special features except that with one exception the cases were all successful, a few of them requiring more than one operation. Some of the cases were in little children about a year old, operated upon as out-patients. Mr. Turner did not think that this was a specially good thing to do, but they were so short of hospital accommodation that he was in a measure compelled to carry out the treatment as out-patients—these all did well. Some of the older children and the two adults talked exceeding well, and Mr. Turner's view was that speech was a matter of education. The most to be expected from even a successful operation was that the patient was brought into a condition in which he could learn to speak correctly.

Mr. Turner then showed a boy from whom he had removed a tumour of the liver weighing 2 lb. 3 oz. It occupied the greater part of the right lobe, including the fissure for the gall bladder, which was excised at the same time. The operation was done in March, and the patient had made an excellent recovery. The tumour, which was shown at the same time, was reported upon as a hepatoma, which he regarded as a true adenoma of the liver, but as some of the cells were atypical he quite expected it to prove to be of a malignant nature.

Mr. Turner also showed a boy suffering from a stricture at the lower end of the oesophagus, which had resisted all his efforts at cure by means of dilatation. He had opened the chest, divided the diaphragm, and made a direct anastomosis between the dilated oesophagus above the stricture and the fundus of the stomach. The patient made a good recovery and had very greatly benefited, although there was still some hesitation in swallowing, and his general condition had not improved as much as he had hoped for.

SECTIONS OF MEDICINE, AND PATHOLOGY AND BACTERIOLOGY.

Professor Thomas Beattie, M.D., F.R.C.P., President of the Section of Medicine, in the Chair.

DISCUSSION ON ENCEPHALITIS LETHARGICA.

OPENING PAPER

BY

Edwin Bramwell, M.D., F.R.C.P.,

Physician to the Royal Infirmary, Edinburgh.

Encephalitis lethargica continues to occupy a prominent place in current medical literature. There are obvious reasons why this should be so, for the features of the disease were unfamiliar, even admitting the possibility that sporadic cases may have occurred in the past and escaped recognition until Economo,[9] Netter,[25] Harris,[11b] and Hall,[11a] described cases in Austria, France and this country respectively, while the incidence of the disease has been world-wide and its mortality alarming. Further, encephalitis lethargica presents a protean symptomatology which is showing a tendency to change in type, and since laboratory methods as yet afford little help in its recognition, there is perhaps no affection which at the moment gives rise to so many difficult problems in diagnosis. Again, although much has been learned regarding the morbid anatomy of the disease and considerable information acquired as to the causative virus, the identity of the specific organism, its path of ingress, and the manner in which the infection is spread, have not yet with certainty been determined. Under circumstances such as these it is advisable that we should pause from time to time and review the existing state of knowledge. In a communication such as this it is neither possible nor is it desirable that I should attempt to describe the features of the disease in a systematic or exhaustive manner, consequently I shall confine my remarks to a brief summary, indicating, in passing, points which appear to afford profitable topics for discussion. In selecting the question of diagnosis for special consideration I do so in the hope that subsequent speakers will discuss aspects of the subject to which I am unable to refer in the time at my disposal.

Exception may be taken to the term "encephalitis lethargica" on the grounds that the pathological process is not limited to the brain and that lethargy, though a frequent and often prominent symptom, is not invariable; while "epidemic encephalitis," a terminology preferred by some writers, is also open to valid objection, since to many cases the term "sporadic" is more correctly applicable. Other alternative synonyms have been employed, but it would appear to be advisable to retain tentatively a nomenclature which is in very general use until such time as the etiology of the disease has been definitely established.

Cases of encephalitis lethargica differ in their mode of onset, in the character of the symptoms which they present, and in the course which they pursue. The symptoms met with fall into two groups—namely, manifestations attributable to an infective process, and phenomena dependent upon disordered function of the nervous system, in which the local lesions are essentially situated. Prodromal symptoms are observed in many cases, although the onset is exceptionally so abrupt that it may suggest an apoplexy. Among the earlier symptoms the following are especially frequent: Lethargy, drowsiness, lassitude, nocturnal insomnia, headache, giddiness, a dry mouth, constipation, hiccough, difficulty in passing urine, muscular tremors, diplopia, blurred vision, tinnitus, and localized pains in various situations. These pains, which are sometimes severe and apt to be misleading, are, I am inclined to think, in some cases of thalamic origin.

Transition from the prodromal period, where this is recognizable, to the actual stage of invasion is sometimes gradual; but, on the other hand, it may be more or less sudden. A rise of temperature, accompanied in some cases by acceleration of the pulse rate and respirations, usually marks the true onset of the illness; the febrile disturbance in the majority of cases is, however, slight, and the temperature commonly falls to the normal within a few days. Headache and a general feeling of malaise, cramp-like pains, sometimes vomiting, and the appearance of various skin rashes, together with a general aggravation of the earlier symptoms, may be observed. Slight rigidity of the neck and hamstring muscles may be noted, as also a transient lymphocytosis in the cerebro-spinal fluid, with, in some cases, a slight and temporary leucocytosis in the blood. A great variety of nervous symptoms may be met with, while symptoms referable to other organs have been described. Thus Netter[26] emphasizes the frequency with which the salivary glands are involved, while Boyd[2] noted the occurrence of an associated acute nephritis during the Winnipeg epidemic. Pneumonic changes are very usual towards the termination of a fatal case.

The nervous symptoms in individual cases of lethargic encephalitis are very varied, and many clinical pictures are met with. An adequate and satisfactory classification which correlates the clinical phenomena with the anatomical distribution of the lesions is not possible, since the symptoms depend not only upon the localization, but also upon the character of the pathological process. Again, a case of lethargic encephalitis may present very different appearances according to the period when it is examined. Further, as Leonard Findlay[10a] and others have pointed out, the symptoms met with in children often present unusual features. A great variety of clinical types have consequently been described. Walshe,[29] who takes exception to the utilization of clinical types for purposes of classification, proposes the following scheme, in which he employs the phraseology of the late Dr. Hughlings Jackson: (1) General nervous symptoms of a positive kind, such as delirium, mania, restlessness, and hallucinations; (2) general nervous symptoms of a negative kind—for instance, lethargy and coma; (3) localizing nervous symptoms of a positive kind, such as convulsions, involuntary movements, muscular contractions, rigidity; and (4) localizing symptoms of a negative kind—for example, paralysis. This classification has the undoubted advantage that it groups the

clinical manifestations according to their nature and mode of production, and while it in itself may not perhaps prove directly helpful in diagnosis, its adoption ensures the maintenance of the broad outlook which is so essential when a disease is still "in the making," and is for this reason preferable to a scheme which is based upon clinical types—a procedure which is apt, I agree, to limit our conceptions.

Evidence as to the nature of a disease may be derived from a variety of sources. The peculiar incidence of lethargic encephalitis, which in this respect presents points of resemblance to epidemic poliomyelitis, the febrile onset and other general symptoms, and the transient changes in the cerebro-spinal fluid and in the blood observed in some cases, clearly indicate that the disease is to be classed with the infective disorders. The anatomical observations of Netter,[25] Marinesco,[22] McIntosh,[16] James Miller,[23] and others corroborate this conclusion. Perhaps the most striking anatomical change consists in an infiltration of the brain tissue, and especially the perivascular lymphatic sheaths of the smaller blood vessels (notably the veins) and their immediate neighbourhood, with lymphocytes and plasma cells. Dilatation of the capillaries is often observed; infarcts in the brain substance, evidently due to thrombosis, are also described (Greenfield[11]); in some cases haemorrhages are met with, while oedema and neuroglial proliferation may be noted (James Miller[23]). Extensive cellular chromatolysis is very usual with, in some cases, an increase of the intracellular pigment. Neuronophagia is but seldom seen (Mott[24]).

Almost all observers emphasize the fact that the pathological appearances above referred to are especially located in the mesencephalon and pons, and more particularly in the grey matter around the iter, as also in the region of the substantia nigra. Often, however, they are much more widespread, while they have repeatedly been observed in the spinal cord. Preconceived ideas dependent upon clinical conceptions which have centred attention upon the brain stem have no doubt been responsible for the limitation of the histological examination in many reported cases, and further systematic observations may demonstrate that in individual cases the intensity of the process is more pronounced in, or actually confined to, other regions of the brain. The pathological process would appear to be of a subacute inflammatory nature. Marie and Tretiakoff's anatomical researches[20] indicate the constant presence of both degenerative and irritative phenomena. Netter[26] believes that the irritative clinical manifestations are attributable to a minimal effect of the virus, and the paralytic phenomena to its more intense action. Walshe[29] points out that the paralytic phenomena are restricted and selective, while the irritative phenomena are non-selective, and appear to affect neurons of every physiological level; he suggests that the virus has a double action and a double incidence.

Clinical experience demonstrates that individuals of all ages may suffer, although adults of middle age are perhaps more liable; that there is no special sex susceptibility; that, although in some instances the patient has a short time previously suffered from a nasal catarrh or from an influenzal attack, he is often in good health at the time of onset; that at times, when the disease has been specially prevalent, influenza has repeatedly, though not invariably, been rife; that cases of lethargic encephalitis have occurred, especially during the colder months;[8] that the incidence of the disease is greater in an urban than in a rural population (Reece[27]); that instances of contagion have been, in the past at least, of extreme rarity; and that no satisfactory information is available as to the duration of the incubation period or the manner in which the infection is spread. My experience is similar to that of most observers, since among 120 cases I have met with no instance in which two cases occurred in the same house, or in which there was any evidence of spread by contact. The outbreak in a school reported by MacNalty[19] is unique.

Experimental results, more especially those of Strauss, Hirshfeld and Loewe, of McIntosh and Turnbull,[17] and of Harvier and Levaditi, are of much interest. It would seem to have been definitely established that, both in the case of rabbits and monkeys, although the latter are somewhat refractory, intracerebral injections either of brain emulsion from a fatal case of lethargic encephalitis, or of nasopharyngeal washings, or (in rabbits) of cerebro-spinal fluid from a patient so affected, may, after passage through a porcelain filter, produce symptoms and histological appearances similar to those observed in cases of the disease in the human subject; while, further, the virus is subsequently capable of transmission from one animal to another. Harvier and Levaditi have also found that the disease may be successfully inoculated into the rabbit by intra-ocular injections, and by injections into the peripheral nerves,[13] but not by intraperitoneal, intravenous, or intratracheal injections. The same observers found that injections of blood, extracts of bone marrow, lung, spleen, kidney, liver, and salivary gland were ineffective in conveying lethargic encephalitis to animals.

Thus it would appear that the virus is located in the brain tissue; that it is also present in the cerebro-spinal fluid, and that it is met with on the surface of the nasopharyngeal mucous membrane. Further, since the virus after passage through a porcelain filter is capable of multiplication, it would appear to be a living organism. Levaditi and Harvier[13] also affirm that the disease can be transmitted by the mucosa of the nose after the latter has been irritated by croton oil. The case of a soldier who was admitted to a military hospital with a nasal discharge of long standing which was attributable to a polypus is of some interest in this connexion; the polypus was removed by operation, and "within a few days" the man, who was under my care and was incidentally proved to be a meningococcal carrier, developed very typical symptoms of lethargic encephalitis. The question arises whether the nasal mucosa is the usual path of infection. Is it possible that the catarrh of the nasal mucous membrane which occurs so frequently in influenza permits of the entry of the virus of encephalitis which is lying on its surface? So far as I am aware, the presence of the virus in the nasopharynx has only been demonstrated in the case of individuals who were at the time actually suffering from symptoms of the disease. Netter,[26] who has drawn attention to the comparative frequency with which the salivary glands are affected, suggests that this may be the path of egress of the virus.

The identity of a specific organism responsible for the disease has not as yet been established beyond dubiety. Since there seems to be definite proof that the virus is filtrable and subsequently capable of multiplication, it appears probable that the bacteriological agent is possibly ultramicroscopic, and for this reason, among others, it would seem that the diplococci described by Wiesner[30] and others were probably contaminations. Strauss and Loewe,[15] using Noguchi's ascitic medium, affirm indeed that they have succeeded in cultivating from the brain, nasopharyngeal mucous membrane, spinal fluid, and blood from cases of lethargic encephalitis, a minute filtrable organism resembling that described by Flexner and Noguchi in poliomyelitis, and, further, that they have recovered the organism from animals which have succumbed after inoculation with the virus and also with cultures so obtained.

In the opinion, however, of some of those best qualified to judge, corroboration of these interesting observations is called for before they can be accepted as conclusive. The minute intra- and extra-cellular bodies described by da Fano and Ingleby[7] in the nervous tissues of cases of lethargic encephalitis, as also by the former observer in a salivary gland from an acute case of the disease, call for mention. Da Fano[8] puts forward the tentative suggestion that these bodies, "to all appearances consisting of a central, generally basophil, particle and of a delicate little stainable body irregularly round or oval in shape," may indicate the presence in the tissue of a living agent, the cause of the disease. Bernard Shaw[27a] reports that he has observed similar appearances. Marinesco[22] in 1918 described bodies resembling diplococci in the nerve cells in a case of lethargic encephalitis, but since the cells in which he noted these bodies possessed no nucleus, he came to the conclusion that they might be chromosomes. Leonard Findlay and C. S. Shiskin[10b] have studied the colloidal gold test in the cerebro-spinal fluid in 21 cases of epidemic encephalitis in children. In 17 of these the fluid behaved differently from the normal. Since the reaction, although differing from that of syphilis, is of the syphilitic type, these observers suggest that the virus may be of the nature of a spirochaete.

The question of a relationship between acute polio-

myelitis, influenza, and epidemic hiccough on the one hand, and lethargic encephalitis on the other, has been repeatedly discussed. Although poliomyelitis and lethargic encephalitis present certain points of resemblance, clinical and anatomical considerations indicate that the two diseases are distinct, a conclusion which is supported by recent experimental work. The evidence as regards influenza is not so definite. A striking though not invariable tendency to a simultaneous prevalence of the two diseases at once arrests attention. Time, however, does not permit me to discuss this problem, which would in itself afford an adequate topic for a separate communication. The generally accepted view at the present time is, I think, expressed by Crookshank when he speaks of an epidemiological liaison between the two affections. Epidemics of hiccough have been met with in many parts of the world during the past year or two. The circumstances that these cases have usually occurred simultaneously with, or immediately before or after, an outbreak of encephalitis, that the hiccough may be preceded by prodromal symptoms and accompanied by slight febrile disturbance, and that this symptom has repeatedly been observed in cases of lethargic encephalitis, are among the chief reasons for the view that epidemic hiccough probably represents a mild type of the disease.

Diagnosis is necessarily often difficult in the case of a disease with such a varied symptomatology, which may simulate or be simulated by so many other disorders, which is characterized by no constant or distinctive symptom, and in the recognition of which laboratory methods have not so far proved to be directly helpful. Netter,[25] when in the spring of 1918 he described the first cases met with in France, emphasized the occurrence of febrile disturbance, lethargy, and cranial nerve palsies—notably pareses of the third nerve with consequent diplopia and associated dimness of vision—as cardinal symptoms. While there can be no question that these symptoms were conspicuous in the majority of the earlier cases which were recognized in Germany, France, and this country, cases of the type so commonly met with in 1918 have of late been relatively infrequent. The febrile disturbance may be so slight as to escape notice; ocular palsies, when they occur, may be very transient; and lethargy may be either absent or replaced by states of mental excitement. Again, these symptoms, even when present, are often masked by more conspicuous manifestations. Consequently, it not uncommonly happens that when a case of lethargic encephalitis is first seen weeks or months, it may be, after the onset of the illness, no history as to the occurrence of a rise of temperature, somnolence, or ocular palsy in the initial stages, can be elicited.

When a new disease is differentiated largely upon clinical evidence, and especially when the symptoms show a tendency to change in type as time goes on, as has been admittedly the case with encephalitis lethargica, a symptom-complex which at first appeared to be distinctive and constant may be found to be too rigid in its confines. The essential purpose of a symptom-complex is to establish the identity of a disease and to assist in its recognition, and if the symptom-complex in question is not sufficiently comprehensive, its retention may, as Walshe has indicated, by retricting the outlook, retard rather than further progress. While the symptom-complex above referred to has served a useful purpose in the past, I for my part no longer allow it to occupy such a prominent place as formerly in my conception of lethargic encephalitis. My reasons are not only that it is not constant, but that, in my opinion, it tends to unduly emphasize the importance of certain symptoms at the expense of others which, if perhaps not so frequent, are, when present, at least as characteristic. Again, the stress that is laid upon this symptom-complex is, I think, apt to exaggerate anatomical localization as a factor in diagnosis by focusing attention too prominently upon the mid brain as the essential seat of the disease.

It is instructive to compare the diagnosis of disseminated sclerosis with that of lethargic encephalitis. When Charcot in his description of the former disease emphasized the occurrence of certain frequent and characteristic symptoms—notably intention tremor, scanning speech and nystagmus—he did not intend to imply that these symptoms were to be considered as constituting an essential symptom-complex. Yet I think I am right in saying that there was a tendency so to regard them, and that some considerable time elapsed before it was generally recognized that other features were equally characteristic, and that disseminated sclerosis could often be diagnosed in the absence of the symptoms above referred to. Consequently it is inadvisable to regard this association of symptoms as a symptom-complex, for to do so is to limit the outlook. Those who have had much experience of disseminated sclerosis realize that it is often essential in arriving at a diagnosis to take into account all the facts, notably the history and course of the case, and the presence of individual symptoms which are more or less characteristic; while it may be necessary to eliminate by a process of exclusion other affections which resemble the disease in question. I agree with Buzzard,[4] Walshe,[29] Haynes,[14] and others that a similar broad outlook is to be adopted in the case of lethargic encephalitis, and in the diagnosis of this disease I would emphasize the following points: (1) The history of onset, with special reference to the occurrence of (*a*) prodromal symptoms (for instance, drowsiness, diplopia, dimness of vision, and pains), and (*b*) febrile disturbance with associated general symptoms (for instance, headache, giddiness, delirium, a dry mouth, constipation, etc.). (2) The presence of certain symptoms and signs which present features often dependent as much upon the nature of the pathological process as upon its anatomical distribution. (3) The exclusion of a number of other affections which in individual cases may closely simulate the disease under consideration.

Among the symptoms and signs to which I would attach particular diagnostic importance are the following:

(*a*) An ophthalmoplegia of central origin and more or less acute onset (characterized, it may be, by bilateral ptosis, palsies of the external ocular muscles of varying degree and distribution, unequal and dilated pupils with sluggish reactions), which sooner or later shows a tendency to improve (although some paresis of the extrinsic, and particularly of the intrinsic, muscles of the eye may persist long after the acute period of the disease has passed off, and sometimes permanently), is observed in a certain proportion of cases, and when present is in itself so characteristic as to be almost distinctive.

(*b*) Transient diplopia, lasting for a few days at the onset of the illness, is of very common occurrence in lethargic encephalitis, and since this symptom is very rarely met with in any other condition its value in diagnosis, especially in those cases which manifest no evidence of ocular paresis at the time of examination, is obvious. As Farquhar Buzzard[4] has pointed out, diplopia is an extremely sensitive indicator of disturbance of function; consequently a history of transient diplopia does not necessarily indicate that the mid-brain is the chief seat of the pathological process, for this symptom may be merely an expression of a widespread process.

(*c*) Nystagmus, which is often observed in cases of lethargic encephalitis, notably in the earlier stages, presents at times unusual features which I have not personally observed in any other condition. Irregular flickering movements, which vary not only in rapidity and amplitude but also in direction, may be noted upon any attempt to move the eyes. I take it that this symptom must be explained by the irregular distribution and possibly the irritative effect of the minute histological lesions which implicate the ocular nerves and their connexions.

(*d*) Paralysis of the conjugate upward movement of the eyes is a symptom I have observed in several cases in which there was otherwise little or no impairment of the ocular movements. I have met with no other affection, with the exception of tumours of the mesencephalon, in which this phenomenon, which is evidently due to involvement of the anterior part of the third nerve nuclei, has occurred as an isolated symptom.

(*e*) Drowsiness and lethargy of varying degree were such prominent symptoms in most of the earlier cases that they scarcely call for special description. No one who has seen a case of the kind in which the lethargy was prominent can forget the patient's appearance as he lies, it may be for hours, motionless, apparently asleep, taking no notice of his surroundings and making no remark. Yet after persistent questioning he may respond intelligently, although his responses are slow, while his intonation may be monotonous and his articulation wanting in precision. A definite history of drowsiness may often be obtained long after this symptom has passed off. Frequently the drowsiness is associated with an occupational delirium, and it may be nocturnal insomnia. Various views are held as to the manner in which the lethargic state is produced, some believing that it is a consequence of interruption of afferent impulses in the brain stem; others that it is due to a hydrocephalus, the consequence of obstruction of the iter; while again it has been attributed to a disturbance of pituitary function.

(*f*) The mask-like face indistinguishable from that of paralysis agitans, and often accompanied by postural attitudes reminiscent of this affection, is a conspicuous feature in many cases and may persist for months after the acute stage. Buzzard,[5] Wilson,[31] and Marie and Levy[21] have emphasized cases of this type. This symptom, which is due to interference with conduction in the extra-pyramidal system, is so common that it is of great value in diagnosis. Although I but seldom observed this appearance among my earlier cases, I have noted its presence in a large proportion of those recently met with.

No doubt the explanation why facial immobility is met with in lethargic encephalitis and not in other conditions is to be found in the fact that the minute lesions of this disease are capable of picking out the rubro-spinal tract and its cerebral connexions without at the same time involving the pyramidal fibres. Many of you will probably recall cases of lethargic encephalitis in which at the first glance you obtained invaluable information from the patient's expressionless face.

g) The mental disorientation often present in the initial stages, and sometimes continuing long after the earlier symptoms have passed off, is very similar to that met with in cases of chronic alcoholism, while it is rarely observed in other affections.

(*h*) Numerous types of involuntary movement—myoclonic, athetoid, and choreic—have been observed, more especially in the cases recently reported. Sicard[28] was the first to describe myoclonic cases, and Ellis[10] and others have recorded cases in this country. A choreo-athetoid type is described by La Salle Archambault.[1] These movements are otherwise so unusual that they should at once recall lethargic encephalitis, and suggest an inquiry with the object of eliciting any further evidence in support of this diagnosis.

Cases of lethargic encephalitis present very different features, and this remark is applicable also to the stage at which the case comes under the notice of the physician. Although there are possible objections to the use of clinical types as a basis of classification, illustrative clinical pictures, when employed for the purpose of demonstrating the resemblance which the disease may present to those which simulate it, are, I think, of the greatest value. In the time at my disposal, however, I must content myself with enumerating those conditions which experience leads me to believe constitute the chief difficulties in differential diagnosis. I have referred to the pains which sometimes occur in the prodromal period, as also to the abrupt onset, which may suggest a haemorrhage, a haemorrhagic pachymeningitis, and especially a cerebral softening. During the febrile stage a meningitis, and particularly the tuberculous variety, may be suspected, while, when febrile disturbance dominates the picture and the nervous symptoms are insignificant, influenza, enteric fever, and even pneumonia (as Sainton has pointed out), are diagnoses which may be erroneously suggested. The resemblance between some cases of lethargic encephalitis and acute alcoholism has been referred to, while in certain instances the disease may pose as an acute psychosis, its organic basis for a time being unsuspected. Paralysis agitans may be simulated so closely that were it not for the history a correct diagnosis would sometimes be impossible. Tabes may at first sight be suggested, when in the later stages of encephalitis lethargica the pupils are unequal and react poorly to light and the knee-jerks are absent. Brain tumour, cerebral softening, and tuberculous meningitis, and especially the first named, are the three affections which, in my experience, are especially apt to give rise to diagnostic difficulty. Very real difficulties sometimes arise in differentiating between lethargic encephalitis and brain tumour.

Prognosis embraces both the risk to life and the ultimate condition of those patients who survive. Some 20 per cent. of the cases I have met with terminated fatally, but this figure, perhaps, overestimates the actual mortality, since the hospital physician no doubt meets with the more severe types. Death may be due to an extension of the encephalitis to the medulla, to pneumonia secondary to paralysis of the vagus or glosso-pharyngeal, or to general wasting complicated by bedsores (Netter). While four-fifths of these patients eventually recover, it is impossible in the majority of cases, when seen in the early stages, to predict the future with any degree of certainty. A high temperature is, in my experience, always a sign of ill omen; indeed, I can recall no case where the temperature reached 102° or over and persisted for more than a week at this height in which the patient survived. Pronounced delirium and a rapid pulse are also of serious import, while the outlook, it is affirmed by more than one writer, is particularly bad in the myoclonic cases; neither the age or sex of the patient, the manner of onset, nor the features of the prodromal stage seem to afford any criteria of value bearing on the subsequent course of the case. Death occurs in the great majority of cases during the first three or four weeks, and although a fatal result is exceptionally delayed to a much later date, the chances are all in favour of recovery after this period has passed.

Although in slight cases the symptoms may clear up entirely in the course of three or four weeks, in others the patient may remain in a stuporose condition for weeks on end, and when this is so improvement is usually very slow. The focal symptoms may for a time show a tendency to progress, and Economo[9] has reported cases which have run a subchronic course extending over several months. A relapse characterized by various types of involuntary movement may, as Buzzard has pointed out, occur a considerable time after the patient has apparently recovered from the original illness. Eventually recovery is often complete or almost complete, but in a considerable proportion of cases some permanent disability persists. Thus, I have met with instances in which ocular pareses and notably pupillary changes were still present eighteen months or more after the attack, and two in which there was a persistent hemiplegia. Several patients two years or more after the original attack complained of defective memory and power of concentration, that they still felt easily tired both mentally and physically, and that although they were able to carry out their routine duties as well as previously, they experienced a want of mental alertness and initiative and an inability to satisfactorily grasp new problems. This question of the end-results in these cases is of much interest, and I hope that some of those present will give us their experience in this connexion.

No method of treatment has so far been discovered which will with certainty arrest the progress of the pathological process. Yet the insidious onset in many cases and the histological appearances are such as to suggest that were a remedy known which had a direct effect upon the causative agent, the morbid changes might be dispersed before irretrievable damage was produced. As Economo remarks, it is very difficult to judge of the effects of treatment in this disease. Netter has employed intrathecal injections of serum from a convalescent patient with possible benefit, although he considers it premature to recommend this procedure. Hexamine has been largely used in the febrile stage in view of the observations of Flexner in experimental poliomyelitis, but we have no definite proof of its therapeutic value. Netter[26] has advocated the use of sialogogues, since he believes the virus may be stimulated by the saliva. The withdrawal of cerebro-spinal fluid by lumbar puncture has sometimes been followed by temporary improvement, and is certainly called for in any case in which there are indications suggestive of meningeal irritation. Netter has been impressed with the results he has observed in cases in which a localized abscess has been produced in the thigh by the hypodermic injection of turpentine, and now advocates this procedure in every case as soon as the diagnosis has been established. This observer affirms that among 27 cases so treated an abscess requiring incision was produced in 19; only 2 of the 19 cases died, and 13 which had been in an apparently hopeless condition recovered completely. In other words, 17 of the 19 cases recovered, whereas of 25 serious cases not so treated 13 died. The risk of contagion is very small, and cases of encephalitis lethargica may be treated in the wards of a general hospital.

REFERENCES.

1 Archambault: *Arch. Neurol. and Psychiat.*, 1920, p. 488.
2 Boyd, W.; *Canadian Med. Assoc. Journ.*, February, 1920.
3 Bramwell, E., and Miller, J.: *Lancet*, May 29th, 1920, p. 1152.
4 Buzzard, E. F.: BRITISH MEDICAL JOURNAL, November 20th, 1920, p. 732.
5 Idem: *Lancet*, April 27th, 1918.
6 Crookshank, F. G.: *Lancet*, March 20th, 1920, p. 677.
7 Da Fano, C., and Ingleby, H.: *Proc. Roy. Soc. Med.*, Section of Pathology, 1919, p. 42.
8 Idem: BRITISH MEDICAL JOURNAL, January 29th, 1921, p. 153.
9 Economo: *Wien. Arch. für inn. Med.*, June, 1920.
9a Idem: *Wien. klin. Woch.*, May 10th, 1917, p. 581.
10 Ellis, W. M.: *Lancet*, July, 1920, p. 114.
10a Findlay, L.: BRITISH MEDICAL JOURNAL, November, 1920, p. 820.
10b Findlay, L., and Shiskin, C.: *Glas. Med. Journ.*, January, 1921, p. 18.
11 Greenfield, J. G.: BRITISH MEDICAL JOURNAL, November, 1920, p. 782.
11a Hall, A. J.: *Lancet*, April 20th, 1918, p. 568.
11b Harris, W.: *Lancet*, April 20th, 1918, p. 568.
12 Harvier, P., and Levaditi, C.: *Rev. de Méd.*, Paris, 1920.
13 Idem: *Compt. rend. Soc. de Biol.*, 1920, p. 83.
14 Haynes, G. S.; BRITISH MEDICAL JOURNAL, June 11th, 1921, p. 849.
15 Loewe and Strauss: *Journ. Amer. Med. Assoc.*, 1919, p. 1056.
16 McIntosh, J.: Rep. Local Govt. Bd., New Series, No. 121, 1918, p. 57.
17 McIntosh, J., and Turnbull, H. M.: *Brit. Journ. Exper. Pathol.*, 1920, p. 89.
18 MacNalty, A. S.: Rep. Local Government Board, New Series, No. 121, 1918, p. 12.
19 Idem: Ann. Rep. Ministry of Health, Appendix vii, 1920, p. 537.
20 Marie, P., and Tretiakoff: *Ann. de Méd.*, January, 1920.
21 Marie, P., and Levy: *Bull. de l'Acad. de Méd.*, 1920, p. 83.
22 Marinesco, G.: Rep. Local Government Board, New Series, No. 121, 1918, p. 47.

[23] Miller, J.: *Lancet*, May 29th, 1920, p. 1152.
[24] Mott, F. W.: *Proc. Roy. Soc. Med.*, Section of Medicine, 1913, p. 1.
[25] Netter, A.: *Bull. de l'Acad. de Méd.*, March, 1918.
[26] Idem: *Presse Méd.*, 1920, p. 193.
[27] Reece, R. J.: Rep. Local Government Board, 1919.
[27a] Shaw, A. F. Bernard: British Medical Journal, February 5th, 1921, p. 210.
[28] Sicard, J. A.: *Presse Méd.*, April, 1920, p. 213.
[29] Walshe, F. M. R.: *Brain*, November, 1920, p. 197.
[30] Wiesner, R. R.: *Wien. klin. Woch.*, 1917, p. 933.
[31] Wilson, S. A. K.: *Proc. Roy. Soc. Med.*, Clinical Section, 1920, p. 65.

C. da Fano, M.D.,
London.

Dr. da Fano said he was very glad to accept the President's invitation to take part in this discussion. He wished to demonstrate the minute bodies which he had been able to find in the nerve cells in several cases of the disease. The actual preparations were to be seen in the museum of the Pathological Section. The lantern slides he was about to show were prepared from these specimens.

The first slide showed a nerve cell from a case investigated by himself and Dr. Ingleby. It was full of minute bodies consisting of a central dark granule surrounded by a halo. The number of these bodies seen in different cells varied greatly. They were not universally present; some cells contained only two or three. On first noticing the bodies he thought that the "halo" might in reality represent a space or vacuolated area, but later he succeeded in staining the halo pale green or bluish with Giemsa. In addition, he showed a slide with vacuoles and halo bodies side by side, and there were obvious differences between the two. The central part of the body appeared to be made of a substance resembling chromatin.

In one of the nerve cells he showed a large body within the nucleus which appeared to be a conglomeration of halo bodies. The significance of this body was uncertain, but recently Levaditi and Nicolau had described similar intranuclear formations in nerve cells from rabbits inoculated with the virus of encephalitis. In addition to their presence in the nerve cells, the bodies he described were to be seen in and around wandering cells in the central nervous system. Some cells of this character were shown surrounded by minute bodies which seemed to be adherent to them. These appearances were noted at the beginning of the investigation, but little importance was attached to them. In a very acute case, however, which was recently examined they were observed again in large numbers. Besides the nervous system, halo bodies had also been found in the salivary glands. In the section shown some were in leucocytes, some free in the tissue. They had exactly the same appearance as those seen in the brain.

Dr. da Fano had no definite explanation to offer as to the significance of these bodies. He pointed out that similar appearances had been noted by Dr. A. F. Bernard Shaw. Quite recently Levaditi and Nicolau described somewhat larger formations of the same character in experimentally inoculated rabbits. Dr. da Fano then read a communication he had received from Dr. A. H. Booth of Victoria, Nigeria. Dr. Booth had seen bodies apparently identical with the halo bodies in fresh blood plasma and juice of lymph glands from patients affected by an obscure disease characterized by lethargy and other nervous disorders. Swelling of the salivary glands was a feature of these cases.

The presence of halo bodies in the salivary gland was very interesting, since it brought in the question as to whether there was any parallel between encephalitis lethargica and rabies. Dr. da Fano then showed two reproductions from papers by Negri and De Rio Hortega. The first showed a structure within the Negri bodies having a striking resemblance with da Fano's bodies. The second was from a case of distemper in a dog. The nerve cells again showed the presence of minute granules surrounded by a halo.

In conclusion, Dr. da Fano said that though the cause of the disease had not yet been discovered, there was evidence of alterations in various tissues similar to those produced by other filter-passing organisms. He then described his findings in an acute case of encephalitis, in which the disease lasted three days. There was intense perivascular or interstitial infiltration of all parts of the central nervous system, but especially of the white matter of the cortex and optic thalamus. In contradistinction to what was generally seen in encephalitis lethargica, the infiltration consisted of polymorphonuclear leucocytes and macrophages, with few lymphocytes and no plasma cells. Such acute cases were rare, and he would like to know whether other histologists had had similar findings.

C. H. Melland, M.D., F.R.C.P.,
Manchester.

I should like first of all to say a few words about the nomenclature of the disease with which we are dealing. When I first began to come across the cases in the winter of 1917–18 I formed the opinion that they were instances of the cerebral form of poliomyelitis, and I published them accordingly as an epidemic of polioencephalitis. As the result of much, and at times almost acrimonious, discussion it has come generally, though not universally, to be thought that the condition is not the cerebral type of poliomyelitis, although it is probably a closely related disease, and so the designation polioencephalitis has been dropped. But I am of opinion that the name which has taken its place—encephalitis lethargica—is a most misleading one. In some cases, no doubt, lethargy is a most striking feature of the disease; in others, I believe the majority, it is inconspicuous or entirely absent. Personally I use the term epidemic encephalitis when speaking of the disease, but even this has its defects, since most of us, on stirring up our memories or looking up our clinical notes, will be able to recall sporadic cases of an obviously similar character met with long before the recent epidemic. When one regards the protean symptoms which the disease may present, according to the part of the brain which may happen mainly to be involved, one feels almost inclined to suggest the name of encephalitis polymorphica as the most suitable designation.

Now I am of opinion that owing to the misleading term "lethargica" a very great number of minor (and some major) cases of the disease fail to be recognized, and in the absence of such recognition the study of the epidemiology of the disease must be naturally wholly imperfect, and it is to cases of this kind that I want especially to draw your attention to-day. They are cases in general of slight paralysis of one or more ocular muscles, with squint and double vision, but with practically no general disturbance and certainly no suggestion of lethargy. The relation of these apparently more or less trivial and transient cases to the more typical severe and often fatal lethargic cases is not easy to demonstrate, but one may meet with an almost continuous sequence of cases from the more serious and typical down to the most trivial, such as I now put before you.

Case I.

A woman, aged 26, a W.R.A.F., a patient of Dr. Scotson of Longsight. There was a sudden onset on January 24th, 1918, with "drooping of the eyelids," the left more than the right. This lasted for four or five weeks. For a fortnight she was dizzy and sleepy; "if she kept still for a few minutes she went fast asleep"; if anyone spoke to her she woke up and answered and then went off to sleep again." Later she noticed that she had double vision. Her doctor sent her to the Royal Eye Hospital, and from there she was transferred to the Manchester Royal Infirmary, where it was recognized that she had a partial third nerve paralysis. The Wassermann reaction of the blood was negative on two occasions after provocative injections of salvarsan. She gradually, but very slowly, improved, but when I saw her in May, 1919, there was still some weakness of the internal rectus of the right side.

Case II.

A boy, aged 13, was admitted under my care to the Manchester Guardians' Children's Hospital on May 2nd, 1919. He had been ill at home for about three weeks with a history of fever and delirium. His doctor sent him into hospital with a diagnosis of "diplopia and severe cerebral pains." He had a slight rise of temperature on the day of admission, and this and the history of his mental condition suggested to one of my colleagues that this might be a case of enteric fever, but the Widal reaction was negative. On examination it was found that he had double vision due to paralysis of the left external rectus and to a less extent of the right external rectus. There was marked double optic neuritis. He seemed quite well in himself after the first day in hospital, and continued so till his discharge about three months later. The optic neuritis and the ocular paralysis slowly cleared up, though he was not completely well in these respects even at the time of his discharge.

Both these cases had marked general symptoms as well as the local paralytic features, and definite evidence in the second of increased intracranial pressure, and would probably be generally recognized as fairly typical cases of lethargic encephalitis with recovery. The next case

is one which I have described in my notes as polio-encephalitis with poliomyelitis. I suppose I must re-christen it as lethargic encephalitis without lethargy but with spinal symptoms simulating poliomyelitis.

CASE III.

An office boy, aged 16, under the care of Dr. Scanlon of Moss Side. He noticed weakness in his legs and a bad headache about the beginning of September, 1918. This came on on a Saturday, and he took to bed on the following Tuesday because he felt so ill. The headache lasted five days, and the weakness in the legs was after a time limited to the left leg, so that on getting up after fourteen days in bed he could hardly bear his weight on the left leg and had to walk with a stick for a time. He still limped slightly when I saw him on December 12th, 1918, and all the measurements of the left leg were about ½ in. less than the right. He noticed double vision about the time he took to bed, and also some drooping of the left eyelid. (He only noticed this last, when looking in the glass, after his attention was drawn to it; it did not affect his eyesight.) When he was examined at the Royal Eye Hospital, on November 26th, his diplopia was then well, except when he looked in certain directions, to the left and downwards. There was paresis of the right internal rectus and slight drooping of the left eyelid.

CASE IV.

A signalman, aged 40, under the care of Dr. Tullis of Hereford. He was well until about Christmas, 1920. Then he began rather gradually to feel run down and weak, and soon after Christmas he began to see things double and had a definite squint. He continued to feel weak and good for nothing, and he had a distinct tendency to drop off to sleep easily, though he did not sleep long. His brother, with whom he was living temporarily when he was first brought to see me at the Manchester Royal Infirmary, in March, 1921, described him as "vacant and not as sharp as he was, and as sitting brooding a good deal and not talking." When I saw him he had a very fixed expression—a fairly typical Parkinson's mask. His pupils were very sluggish both to light and accommodation; his optic discs were normal. His diplopia had recovered, and there was no evidence of any paresis of ocular muscles. His face and his apparent lack of interest in what was going on suggested early general paralysis, but he talked quite intelligently when persuaded to be interested; his speech was slow, but not slurred or stumbling. His blood gave a negative Wassermann reaction. I have recently heard from his doctor and his brother that he is well again and that he has returned to work.

CASE V.

A clerk, aged 49, was admitted under my care to the Manchester Royal Infirmary on November 19th, 1919. He had been quite well until the day before admission; then he felt dizzy about breakfast time, and found that he was seeing double. On examination he was found to have nystagmus on looking to the left with both eyes; there was paresis of the right internal and right inferior rectus muscles and slight drooping of the right upper eyelid. He seemed quite bright and well in himself, with certainly no undue sleepiness, and continued so till his discharge from hospital about three weeks later. His blood also was negative to the Wassermann test.

CASE VI.

A man, aged 47, a patient of Drs. Dunstan and Mitton of Crewe. I saw him on December 8th, 1920. He gave a history that about five weeks before, on a Sunday evening, he had suddenly developed double vision. This came on all in a moment and was accompanied by dizziness. Next morning the dizziness had gone, but the double vision remained and continued. He described to me that his right eye turned outwards at first, but that after an hour or two, having had a rest and a sleep, his right eye became straight and his left eye turned out. Next morning the noticeable turning outwards of the left eye had gone, but he still saw double, especially if he looked downwards. When I saw him there was a slight convergent squint, affecting particularly the left eye, when looking at a near object below the level of the eye. He was very irritable and nervous generally, his nerves so on edge that he could hardly bear anyone to speak to him, and this continued along with the diplopia for many weeks afterwards.

CASE VII.

A woman, aged 48, a patient of Dr. Robertson of Middleton, Lancashire. She had sudden onset of squint, which she noticed first on getting up in the morning three weeks before I first saw her at the Manchester Royal Infirmary on July 1st, 1921. This was accompanied by diplopia and, temporarily, by a certain amount of pain in the right side of the forehead. She vomited twice the morning it came on, but there was no dizziness, no sleepiness—if anything, she was unable rather to "catch her sleep"—and she felt all along perfectly well in herself. There was complete paralysis of the right external rectus, no other muscles being involved, except perhaps a slight degree of ptosis of the right eyelid.

It is the cases of similar type to these later ones which are, I believe, so much more common than is generally regarded, and the true nature of which fails, in many instances, to be recognized. They often appear very trivial, and yet I have published elsewhere notes of similar apparently trivial cases in which the presence of grave intracranial disturbance has been proved by demonstration of the presence of optic neuritis. It is because I believe insufficient stress has been laid upon them that I have welcomed this opportunity of bringing them to the wider notice of the profession.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

STRANGULATED SCROTAL HERNIA WITH A VOLVULUS OF THE SMALL INTESTINE IN THE INGUINAL CANAL.

A DUSTMAN, aged 52, was admitted into the Norfolk and Norwich Hospital on June 29th, 1921, under the care of Mr. Everett. Five hours previously he had suddenly experienced acute pain in the right scrotum. The pain was present on admission, and was accompanied with profuse vomiting of partly digested food. He had had a right scrotal hernia for years, but had always been able to reduce it until the onset of this acute pain. He had worn a truss, but this had never been really effectual. Examination on admission showed a large right scrotal hernia with considerable bulging of the right inguinal canal. The hernia was irreducible. The right testicle could not be felt.

Operation.

Operation was performed one hour after admission. An incision was made parallel to Poupart's ligament over the inguinal canal. The external oblique muscle was divided as far as the external ring. The latter was found to be constricting the scrotal portion of the hernia. A director was inserted with difficulty and the external ring was divided. The coverings of the sac were separated, and the sac was opened in a downward direction. About two and a half feet of distended small intestine were then pulled up out of the scrotum. This length of small intestine appeared healthy. On pulling down the small intestine lying in the canal a loop that was plum-coloured and obviously strangulated appeared to come through the internal ring. The portion of small intestine lying in the canal was then examined and found to be twisted on itself. The volvulus was unravelled and hot saline applied to the congested portion. The circulation commenced to return immediately. The intestines were then replaced in the abdomen.

The scrotal sac was then inspected, and a slightly undersized testicle was found which was completely invaginated into the sac, so that it appeared to be lying free; it did not reach to the bottom of the sac. About one and a half inches of the cord immediately above possessed a small mesentery. Owing to the combined condition of the cord and testicle, orchidectomy was performed. The cord was divided at the level of the external ring. The sac proximal to the external ring was then freed, a purse-string suture was inserted into the sac at the level of the internal ring, and the sac below this was divided. The conjoined tendon could not be identified, so the external oblique was reunited with silk mattress sutures, and the skin incision closed.

The patient made an uneventful recovery, and was discharged on July 18th, 1921, having been fitted with a truss provided with an extra large pad over the site of the external ring. The testicle, on pathological examination, was reported to be fibrotic and atrophied.

I am much indebted to Mr. E. W. Everett for permission to publish the notes of this case.

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A LARGE RENAL CALCULUS.

THE following case is perhaps of some interest owing to the size of the renal calculus and the condition of the kidney in which it was found:

A fellah, aged about 50 years, entered hospital on June 29th, complaining of pain, severe and continuous, in the left renal region. His urine was slightly cloudy, was of low specific gravity, and contained a trace of albumin. An *x*-ray picture showed a large stone in the left kidney, and a smaller one in the right. The patient insisted that the right side gave no trouble, that he had come for relief only of the left side, where a dull grinding pain had existed for years; for that pain he begged for operative intervention on the left side only.

Next day, under spinal anaesthesia, by a large incision in the lumbar region I removed the left kidney. Its substance was represented by a sort of capsule, or thin mitten, drawn over the calculus. The weight was 1,130 grams (about 2½ lb.). The operation did not diminish the renal secretion. In fifteen days the man left hospital perfectly satisfied.

Three years ago I removed a renal calculus weighing a little less than a kilogram. In that case the kidney had dropped and become an evident abdominal tumour. I removed it by laparotomy; the other kidney was quite healthy. Both specimens I offered to Professor Marnoch for the surgical museum of Aberdeen University. In the first case I removed the stone from the much-attenuated kidney substance; this latter calculus I sent home in its capsule. My best thanks are due to my excellent hospital assistant, Dr. Iatrou, for devotion in the after-treatment, and to Dr. S. Nahas, radiologist, for care bestowed on the pictures of the calculi.

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Reports of Societies.

TREATMENT OF CONGENITAL SYPHILIS.

AT the first meeting for session 1921–1922 of the Royal Medico-Chirurgical Society of Glasgow, held on October 7th, Dr. G. B. FLEMING read a communication on "The post-natal treatment of congenital syphilis." After briefly outlining the methods of treatment by mercury and their results, he spoke of mercurial treatment combined with treatment by the salvarsan group of substances, and explained the methods adopted at the Royal Hospital for Sick Children in Glasgow for injecting these drugs. In considering the results of treatment the criterion of cure adopted was a negative Wassermann reaction which remained negative. It had been possible to analyse 74 cases treated between 1917 and 1920, and 35 cases had been followed up for longer or shorter times after treatment ceased. In children under one year—47 cases in all—44 had negative Wassermann reaction at the end of treatment, and 15 out of 21 were still negative after six months. In children over a year old, of whom there were 27 cases, 20 were negative at the end of treatment, and 8 out of 14 tested were still negative after six months. These facts seem to show that intravenous injection of salvarsan reinforced by mercury was the best post-natal way of treating congenital syphilis. The younger the patient the greater was the probability of cure. A case should only be pronounced cured when the Wassermann reaction had been proved to remain negative.

Dr. ETHEL CRAWFORD then read a paper on "Sulfarsenol in congenital syphilis." The damage to the tissues when salvarsan or neo-salvarsan was given intramuscularly had led to the use of an arsenical preparation with a sulphurous acid radical incorporated, named "sulfarsenol," which could be injected intramuscularly without local injury. This substance was tried in a series of cases and in various doses without any toxic symptoms resulting. Thirty-five children were so treated, and they all improved with remarkable rapidity so far as symptoms were concerned, but so far as the Wassermann reaction was concerned the results were not so satisfactory. In children under 1 year when the treatment was commenced, of 23 cases, 14 remained positive and 9 became negative. In children over 1 year, of 12 cases treated 11 remained positive and 1 became negative. The number of doses given varied from 7 to 18. The results showed that the intramuscular injection of sulfarsenol was not as efficacious in producing a cure of congenital syphilis as the intravenous injection of salvarsan substances, if cure was to be judged by the behaviour of the Wassermann reaction.

Professor C. H. BROWNING made a communication on "The antisyphilitic action of arsenical compounds in relation to their constitution." Although for one reason or another there were many substitutes for the original "606," they were all similar in chemical constitution to salvarsan, although there was an unfortunate diversity of names. Atoxyl had a serious effect on the optic nerve, and while atoxyl was a stage in the synthesis of salvarsan, there was nothing to encourage the belief held by some ophthalmologists and others that salvarsan had any harmful action on the nervous system. Atoxyl bore a relation to salvarsan that might be compared with the relationship of sugar to alcohol. There was, however, danger in allowing solutions to remain exposed to air for long, as the solutions underwent decomposition; and there was also some danger from any large quantity of fluid used at one time. Nowadays improved methods of administration and improvements in the drug itself had eliminated these risks. Salvarsan substances were not clearly defined chemical entities. They were colloidal substances, incapable of definite purifying, and consequently impurities appeared in the various preparations. These modified solubility, reaction after administration, etc., and might possibly modify the toxicity of the drug in the body. Thus it was an impossibility to test the activity of any of the salvarsan substances *in vitro*; it must be done *in vivo*. This was done with some of the substitutes but not with others. The tests should be controlled by a disinterested party. The relative efficacy of the members of the group was not only a scientific question but a practical one. Whereas the new substances were more easily given than the old, the balance of efficiency lay with the old. In most instances, however, the administrator was anxious to avoid danger, and therefore used the least toxic substance, although it was possible that by reducing toxicity the therapeutic effect was also reduced. In the case of the original salvarsan a febrile reaction was often produced. An inquiry, years ago, was made into the history of syphilitics in the Austrian army and afterwards, and it was found that those men who had developed a fever reaction after infection did not develop general paralysis. In checking the efficiency of treatment the disappearance of clinical symptoms was not a sufficient test, and therefore the more rigorous biological tests, the Wassermann and the precipitation tests, should be used.

Dr. J. R. C. GREENLEES spoke on the ante-natal treatment of congenital syphilis. Post-natal treatment of congenital syphilis attacked the disease too late. The focus of the infecting spirochaetes was probably the placental tissue, and therefore treatment should aim at prevention of their development there, and their spread to the foetus. Ante-natal treatment with mercury and iodide of potassium had long been tried, but had been found wanting. In Galliot's statistics 217 pregnant women actively syphilitic were treated, with only 17.4 per cent. of living births; while in pregnant women suffering from latent syphilis similarly treated 75 per cent. of the pregnancies proceeded to a successful issue. Dr. Greenlees quoted several cases showing failure after thorough treatment, in the absence of active syphilis. In contrast to this were the histories of fifteen cases treated at the Royal Hospital for Sick Children, Glasgow, where ante-natal treatment was carried out with arsenical compounds and mercury, and 100 per cent. of successes resulted. Some of these cases were followed up for as long as seven years.

Dr. LEONARD FINDLAY read a communication on "The ravages of congenital syphilis, and how to combat them: a plea for notification." The foregoing communications showed that ante-natal treatment was the treatment *par excellence*. Prophylaxis was beyond question better than curative treatment. As some of the children born healthy and without symptoms subsequently developed a positive Wassermann reaction, it was too early to be quite certain that symptoms might not develop later. Further, the ease of the ante-natal method of treatment and the avoidance of the pain and misery many young syphilitics underwent in the course of the curative treatment were striking recommendations in its favour. Dr. Findlay criticized statements recently made as to the question of change of type of congenital syphilis, to the effect that it was becoming less severe in its manifestations. He strongly advocated the application of the ante-natal method of treatment by the general practitioner, and voiced the opinion that with the Wassermann test available and the new salvarsan preparations so easily administered, there was no necessity for the special venereal clinics, nor for the so-called venereal specialist, in the case of syphilis. In concluding, he referred at some length to the desirability of making syphilis a notifiable disease, with particular regard to its influence on infantile mortality.

CANCER OF THE BREAST.

THE fortieth session of the West London Medico-Chirurgical Society opened on October 7th, when Sir GEORGE LENTHAL CHEATLE delivered his presidential address on "A study of breast cancer in relation to the cancer problem." He said he had always been deeply impressed

with the fact that any sufficient stimulus—mechanical or chemical—would cause the egg to awake and divide. If the stimulus was a living one, it was probably of a physico-chemical nature. There were many factors influencing cell division—for instance, age, sex, and heredity. He particularly emphasized the importance of life-wear and nerve influence on the epithelial cells in this connexion. He had investigated some 200 cases of carcinoma of the hand with a view to ascertaining the points of incidence of the disease. In only four did it begin in the palm. In most of the rest it commenced on the dorsum in the skin over the second metacarpal bone. He thought that the rarity on the palms was explained by the protection which the horny layers afforded the underlying delicate epithelium. As instances of nerve influence on epithelium he cited cases of greyness occurring in definite nerve areas, and several lantern slides were shown illustrating this. He had many years ago been struck with the similarity between the changes which occurred in the common "enlarged" prostate and other glands, and the changes he was about to describe as occurring in the breast.

In considering cancer of the breast he did not believe that corset pressure was an important factor; the traumatic mastitis that might result from this rapidly disappeared on removing the cause. He showed how a diffuse, benign, desquamative hyperplasia of epithelium induced cyst formation in ducts and acini, or in ducts alone and acini alone. He believed the cause of the hyperplasia to be due to an irritant within the ducts or acini respectively. The irritant might enter the breast by the open orifices of the ducts on the surface of the nipple. He did not believe that the inflammation sometimes seen outside the ducts was the cause of the hyperplasia within. This was in many cases secondary and due to the irritant leaking out here and there, and causing isolated collections of lymphocytes.

The formation of cysts meant stagnation of contents, and as they caused irritation their action might remain undisturbed over long periods. Hence two possible events might occur: (1) the formation of uni- and multi-radicular papillomata (simple), and (2) the development of definite cancer (papillomatous or laciform). All of these he described as beginning in duct cysts and in more than one part of the same breast. The multi-radicular papillomata were often malignant, and for this reason were the more important. The ampullae of the ducts were a favourite site for their growth. The laciform type of duct cancer was very malignant, and might be pure or mixed with the papillomatous type. Cysts containing papillomata or cancer were first small cysts. The epithelium of the large cysts was so atrophied and degenerated that it was no longer capable of responding to the stimulus of further irritation.

Many surgeons were saying that because they had never seen cancer in breasts from which they had removed cysts, therefore cancer in cysts must be rare. There was nothing in that statement. He had recently had a breast sent him for examination which had been removed for cysts only. In it was a multi-radicular papilloma, and near it a focus of cancer invading the fat around it. Again, if surgeons removed cystic conditions, they had removed possible sites of cancer. The small cysts were the most dangerous, as in them the epithelium was active.

POLYPOID DECIDUAL ENDOMETRITIS.

A MEETING of the Section of Obstetrics and Gynaecology of the Royal Society of Medicine was held on October 6th, with Professor HENRY BRIGGS in the chair. Dr. FRANK NYULASY (Melbourne) read a paper on polypoid decidual endometritis, illustrated by the epidiascope and by microscopical and naked-eye specimens.

In introducing his subject Dr. Nyulasy quoted from a leading article on puerperal mortality in the BRITISH MEDICAL JOURNAL of March 5th, 1921: "It is a disheartening and almost humiliating discovery to find by the Registrar-General's report that puerperal mortality in England and Wales, both as a whole and as regards puerperal sepsis separately, was greater in 1919 than in any year since 1905," and "our present methods for preventing puerperal infection are still insufficient." One important cause of puerperal septic infection seemed to be generally overlooked—namely, polypoid decidual endometritis, first mentioned by Virchow in 1861, under the name "Endometritis deciduallis polyposa vel tuberosa," because of the peculiar appearance of the decidua in a three months' abortion case which came under his notice. Since Virchow's single observation, other observers had recorded odd cases associated with abortions, but generally the condition had been regarded as a pathological curiosity of extreme rarity. The author's own observations, extending over many years, however, showed that the disease was not uncommon, though often unrecognized; that it was associated with full-time labours, and not only with abortions; and that it was not an uncommon cause of septic infection with its consequences. The existence of the disease in full-time pregnancy was of the highest practical importance; for although after labour in such cases the placenta or a portion thereof might be found adherent to the diseased decidua, it might come away apparently "complete," leaving behind the masses of polypoid decidua, which were extremely prone to undergo septic infection, and, if not promptly removed, to lead to death of the mother.

This disease was a result of pre-existing chronic endometritis beginning prior to, or coincidentally with pregnancy, and continued into the puerperium, during which acute processes were grafted upon the chronic condition in consequence of septic infection. Chronicity was indicated by the fact that it was often found to be distinctly syphilitic in nature. An extreme degree of endarteritis obliterans, essentially a chronic process, was always found in such cases, and to an extent far exceeding the amount ever seen in the normal puerperal uterus and ripe placenta. With it there was often much organization of large thrombosed capillaries and new formations of fibrous and muscular elements. The venous spaces were mostly empty, except for a few blood corpuscles, and lined with a single layer of endothelium, at times actively proliferating. Decidual cells—rounded, oval, polygonal, or flattened—were found in some specimens over fairly large areas, often separated by bands of muscular and fibrous tissue or forming "decidual islands." Recent inflammatory reaction was chiefly shown by small round-celled infiltration, small extravasations of blood, and active endothelial proliferation. In some sections a few villi were found attached to the polypoid tissues; occasionally the whole placenta was attached. On the other hand, it might come away without expression and apparently "complete," leaving on its site large or small, irregularly rounded, or dome-shaped masses of chronically inflamed decidua, so full of vessels as to resemble cavernous angiomata. These masses were favourable beds for the development of septic organisms, and accounted for many of the cases where the most careful practitioners had apparently "left something behind," even after a minute scrutiny of the expelled placenta. Polypoid decidual endometritis was neither a hypertrophic nor an adenomatous condition, as formerly taught, but a combination of chronic endometritis and metritis, exaggerated by pregnancy and usually showing the signs of acute inflammation grafted upon the old chronic condition, as the result of sepsis in the puerperium. Dr. Nyulasy showed examples of unrecognized specimens of uteri with well marked polypoid endometritis, but given some other title. If practitioners would submit to microscopic examination the material removed when clearing out retained products of conception after labour or miscarriage, the disease would be recognized much more often.

Clinically, the patient might seem to be doing well for a day or so, but usually there was a slight rise of pulse, then of temperature, which might rise suddenly on the third day or later to 103° or 104° F. with a rigor. Sometimes free bleeding occurred after labour, but profuse secondary haemorrhage was not common, though a sudden rather free flow after the passage of a normal amount for two or three days was suggestive. The diagnosis depended on the presence of subinvolution, a patulous os, generally admitting two fingers, and in the uterus a mass of varying size, usually covered with blood-clot, together with the symptoms above described; an early rise of pulse was most important. Prognosis depended on the virulence and dosage of the infecting organism and the tissue resistance of the patient, but chiefly on prompt and efficient removal of the polypoid masses after labour or miscarriage. Almost every case recovered if operated upon early, but the danger was extreme if operation was delayed. Early and complete removal of the masses was essential for satisfactory results; from the third to the fifth day was the best time. Death was known to have occurred in some cases of this disease on the tenth day after delivery; hence postponement of operative treatment was inadvisable. The greater part should be removed by the fingers, but the remainder (which might extend down to the internal os) could, if

preferred, be evacuated by a large-looped sharp curette. The fingers alone might be employed by those who thought they could thus operate satisfactorily.

The President confirmed the accuracy of the descriptions of the tissues removed from the uterus, but doubted whether the interpretations placed upon them by Dr. Nyulasy could be wholly substantiated.

Dr. J. S. Fairbairn expressed some difficulty in understanding clearly what Dr. Nyulasy's thesis was. These polypoid conditions of the interior of the puerperal uterus were familiar, but he did not feel convinced by this paper that it was a specific condition, though the author's careful investigations greatly strengthened his position.

Dr. Amand Routh thought that pregnancy, in cases of polypoid endometritis, must be rare, but if the author's view of its frequency were confirmed, it would be a distinct advance in knowledge of the causation, prevention, and treatment of puerperal sepsis. He advocated much more careful investigation of adherent tissue removed from the septic puerperal uterus.

Dr. Arthur Giles congratulated Dr. Nyulasy on his valuable contribution to a subject so far too little investigated. He thought that careful attention to this subject, leading to early treatment, should materially reduce the mortality after childbirth.

The first meeting of the new session of the Leeds and West Riding Medico-Chirurgical Society was held at the Leeds General Infirmary on October 14th, when the new President, Sir Berkeley Moynihan, occupied the chair. There was a very large attendance of members. Amongst a number of interesting cases and specimens on view Mr. Carlton Oldfield showed a specimen of "ovarian gestation." At the conclusion of the discussion on cases Sir Berkeley Moynihan delivered his opening address on "Medicine in art." A large number of lantern slides illustrating the portrayal of diseases and deformities in the works of the great masters were shown by the speaker.

Reviews.

THE ENGLISH PRISON SYSTEM.

It is not possible to write within the space of this review an adequate notice of this book, the importance of which is signified by the manifold interest of its contents as well as by the author's long experience and deep study of his subject. In a comparatively small volume Sir Evelyn Ruggles-Brise [1] has given to all who desire either general or special information a full, concise, and eminently readable account of the system of prison administration in this country, prefaced by an historical retrospect of the relation of imprisonment to punishment for crime, and of the objects of state-punishment generally. This work is unique in English prison literature, for among the writings and discussions which have appeared here from time to time on crime and punishment in their various bearings no book approaching it in thoughtfulness, accuracy, and practical value has ever been placed before the public by an expert hand.

During the period covered by Sir Evelyn's chairmanship of the Prison Commission, which began almost coincidently with the maturing of the Prison Act of 1898, there have been many important happenings of great moment. The notable Report of the Committee of Inquiry which led up to this Act unquestionably marked an epoch in English prison history—a passage, indeed, from old to new conceptions and methods of punishment. This Act was followed by several others, largely governed by the spirit of the words used in the above mentioned report, saying that "prisoners have been treated too much as a hopeless and worthless element of the community, and that the moral as well as the legal responsibility of the prison authorities has been held to cease when they pass outside the prison gates." From this date onwards, mainly owing to the initiative and energy of Sir Evelyn, far-reaching changes have been taking place, and are still proceeding, in the reorganization and improvement of the prison system. Among these changes were the Probation Act of 1907, the Children Act of 1908, the Prevention of Crime Act of 1908, which established (1) the special Borstal system of treating young prisoners of both sexes, initiated by Sir Evelyn at Borstal several years before, and now fully proved to be of great value; and (2) the new system of preventive detention under which habitual criminals, sentenced for long periods, are treated specially: one of its objects being that of ascertaining as far as possible the number of such prisoners as may give to a specially appointed committee of advisers good reason for believing that they can be discharged from prison under a strict special licence while their sentences are still running. A notable measure of success has resulted from this part also of the Prevention of Crime Act. In this context Chapter V on Preventive Detention, Chapter VIII on the Borstal system, and Chapter XIV on Aid-on-discharge, are of much interest, and illustrate the value of the scheme conceived by Sir Evelyn, and now in full operation, of the Central Association for the aid of discharged convicts and the Association for the care of inmates released from the Borstal institutions.

Throughout the author's account of the reforming movement of the last quarter-century, during nearly all of which period I had the opportunity of closely following it, the great importance of the medical element in prison administration comes out clearly. Stress is laid on this in the preface and other parts of this book, and in Chapter I, "On the Meaning of Prison Reform," the author states his opinion that "the medical care of criminals in this country is as exact and patient and considerate as can be secured by an able, humane, and untiring medical staff." It may be said here that, especially during the last dozen years or so, the work of the medical officers of our prisons has been very onerous, owing not only to the rapid growth of medical knowledge from the latter part of last century up to now, but also to various incidental circumstances. Within this period the whole question of prison diets has been reorganized on a scientific basis, and from time to time modified, under the technical supervision of successive medical inspectors, especially by Sir Herbert Smalley and Dr. Treadwell, late Medical Commissioners of Prisons. The difficulty of this task was greatly increased by the necessary changes introduced under the stress of the war time, when there was much scarcity of the staple foodstuffs. Nor must we forget the exceptionally grave responsibility thrown by the Government on the prison medical officers, both before the war and later, during the frequent and protracted spells of "hunger striking" on the part of various classes of prisoners commonly described as "political." For these medical officers were charged with the extraordinarily harassing obligation of reporting from time to time whether such persons were physically and mentally fit for further detention. I venture to hope, as I have long contended, that in case of further occurrences of this kind the whole responsibility of preserving the life of such persons will be cast on their own friends and advisers, to whom all possible facilities and means should be provided by authority. Recent events seem to justify this hope, if they may not as yet have solved this difficulty.

In Chapter XIV, on "The Medical Service," Sir Evelyn gives a detailed account of the functions of the medical commissioner, the medical inspector, and the medical officers of prisons, and pays the following well-merited tribute to the medical officer as an "expert" in mental disease: "Although a practical acquaintance with lunacy is expected of a candidate for the medical service, it is owing to the exceptional opportunities afforded for diagnosis of the varying and often peculiar mental states of prisoners that he is expected and is able to give an expert opinion on cases of doubtful insanity and mental defectiveness. The growing practice of the courts to remand for special observation in prisons when any doubt exists as to the state of mind has the desired result of preventing the commitment to prison of persons who would be certified to be insane almost as soon as received. Twenty years ago the number certified insane after reception into prison was a little over 1 per cent. of the total receptions. To-day it is about half that number."

The sixteenth chapter, "A Criminological Inquiry," is devoted to an account of the work entitled *The English Convict: a Statistical Study*, which was published in 1913 by the Government as an official Blue Book, and has since, in 1919, appeared in an abbreviated form as the work of its author, the late Dr. Charles Goring. Sir

[1] *The English Prison System.* By Sir Evelyn Ruggles-Brise, K.C.B., Chairman of the Prison Commission for England and Wales, and President of the International Prison Commission. London: Macmillan and Co. 1921. (Octavo, pp. xix + 275. 7s. 6d. net.)

Evelyn makes it clear that he "does not attempt to criticize either the method or the conclusions of this work, being aware that such an attempt would involve much discussion of some matters on which there is much difference of scientific opinion." But it seems probable that readers interested in this chapter as well as in the preface, where the work is referred to as the "first attempt to analyse the causes of crime by strictly scientific method," will infer that Sir Evelyn has virtually given his imprimatur to the method employed and the conclusions arrived at in the *Statistical Study;* and that the very absence of criticism may lend colour to this inference.

Sir Evelyn states that this *Study* is the first essay made to arrive at results on criminology by the strict application of what is known as the Biometrical Method of statistical treatment of recorded observations: but there are those who hold that this method is not always applicable, and is not applicable to certain parts of the inquiry in question, which deals with some biological and psychological matters that are not so simple as they are made to appear, and therefore cannot be correctly handled as recorded observations.[2] Space prevents me from supporting this position here by more than a few remarks on that part of the *Statistical Study* which relates to the question of the comparative importance of so-called constitutional or natural or "inherited" characters which contribute to the make up of criminal persons, and to the final conclusion on the question, based on the use of the biometrical method, that "relatively to the origin in the constitution of the malefactor, and especially in his mentally defective constitution, crime is only to a trifling extent, if to any, the product of *social inequalities, adverse environment, or of any other manifestations of what may be called the force of circumstances.*

This conclusion, based on this method, implies several assumptions, such as (1) that the *observable* mental characters of men are practically divisible into the above mentioned two categories, and can be severally treated as either one or the other; (2) that the mental quality of intelligence, apart from other mental factors, is to be regarded as of exclusively constitutional origin; and (3) that the confessedly *possible* environmental factors of crime can be eliminated as such by selecting certain of such possible factors as may have been adduced by various writers as causes of crime, by showing that they possess no significant correlation with crime. It thus appears that much of the material involved in this inquiry differs widely from that which can be practically estimated by measurement, and that in this instance the biometrical method in some of its applications cannot claim to have "founded a new knowledge of the criminal upon facts scientifically acquired and upon inferences scientifically investigated." It may, as Huxley said in quite another context, be "compared with a mill of exquisite workmanship which grinds material to any degree of fineness, but what comes out of it depends upon what is put in." As to that part of the inquiry, however, which deals with the strictly physical and measurable observations on criminals and with the teaching of the Lombrosian or "positive" school of criminologists, I wholly agree with Sir Evelyn's view that this work finally abolishes the once popular belief in the existence of an anthropological type of criminal.

H. BRYAN DONKIN.

PULMONARY COMPLICATIONS OF INFLUENZA AND MEASLES.

Epidemic Respiratory Disease, or "The Pneumonias and other Infections of the Respiratory Tract accompanying Influenza and Measles," is the report of a commission, consisting of E. L. OPIE, A. W. FREEMAN, F. G. BLAKE, J. C. SMALL, and T. M. RIVERS,[3] appointed by the Surgeon-General of the United States Army Medical Corps in July, 1918, to study the pneumonias prevalent in the army. This commission started work at Camp Funston in August, 1918, when the pneumonia, chiefly in coloured troops drafted from the Southern States, had a low mortality rate, presented few complications, and differed from the ordinary pneumonia of civil life in being associated etiologically with those types of pneumococci—Pneumococcus atypical II, Type III, and the group of micro-organisms represented as Type IV—commonly present in the mouths of normal persons, whereas Pneumococcus Type I and II, which are responsible for two-thirds of the lobar pneumonia in ordinary civil life, were either present very exceptionally or absent. Early in September the commission moved to Camp Pike, where throughout the encampment pneumonia had been so rife as to place it third in the death rate in lobar pneumonia and fourth in the death rate in bronchopneumonia among the thirty-two camps in America. In September, soon after their arrival, there was a severe outbreak of over 12,000 cases of influenza, with 1,499 cases of pneumonia and 466 deaths. This valuable and detailed report may with advantage be compared with that of a similar commission presided over by W. G. MacCallum, Professor of Pathology in the Johns Hopkins University, and published in the *Johns Hopkins Hospital Reports*, vol. xx (vide BRITISH MEDICAL JOURNAL, 1921, i, 710, May 14th). It contains seven chapters contributed by various combinations of the members of the commission, the last chapter, summarizing the results of the investigations, being from the pen of Professor E. L. Opie, of the Washington University, St. Louis, where the study of the pathological changes was completed.

In view of the unsettled state of opinion on the subject, three members of the commission specially investigated the bacterial etiology of influenza, and preface their research by a short critical review of the history of this disputed problem. After full discussion of their results they conclude that the *Bacillus influenzae* is in all probability the specific etiological agent of epidemic influenza, thus disagreeing with W. G. MacCallum's view that the virus is invisible, ungrowable, unstainable, and different from the bacteria at present recognized.

There is no reason to believe that the recent pandemic influenza differed essentially from that of 1889–1890, and it should be regarded as a self-limited disease of two to five days' duration, never proving fatal unless complicated. In 36 per cent. of the influenzal cases there was purulent bronchitis, with, in addition to the influenza bacillus, other micro-organisms, such as pneumococci, haemolytic streptococci, and *Streptococcus viridans;* the same bacterial flora was found in the cases with pneumonia, which though usually bronchopneumonia was lobar in 40 per cent. Clinically a diagnosis between these two forms is very difficult, as was shown by the 36 per cent. of erroneous diagnoses among 227 cases at necropsy; the difficulties are in part due to the frequent association of lobar pneumonia with purulent bronchitis or with bronchopneumonia, or with both. Half the fatal cases showed invasion of the lungs and blood by the haemolytic streptococcus. The pneumonia following measles reproduces the anatomical and bacteriological features of post-influenzal pneumonia, and this suggests that influenzal infection plays a part in the production of pneumonia after measles.

The account of secondary infection of influenzal and pneumonic patients has important practical bearings; an influenzal patient may carry pneumococci and streptococci capable of causing pneumonia, but usually the organism responsible for pulmonary complication is derived from someone else; and an influenzal patient runs a grave risk by contact with pneumonic cases, especially those due to the haemolytic streptococcus. Each case of pneumonia should be strictly isolated, not only to prevent infection of others but to avoid additional infection by other types of pneumococcus or the haemolytic streptococcus; and it is pointed out that an individual primarily attacked by influenza may suffer from a succession of pneumonias, one micro-organism preparing the way for another. The microscopical changes are clearly described and well illustrated, and the five following forms of post-influenzal pulmonary disease are recognized: Acute bronchitis, haemorrhagic pneumonia, secondary pyogenic infection of the bronchi and lungs,

[2] I have dwelt in some detail on this *Study*, and on the relation generally between mental defect and crime, in the *Journal of Mental Science* for July, 1916, January, 1917, April, 1919, and in two lectures delivered to the class of Psychological Medicine at the Maudsley Hospital in October and November in 1920, and published in the *Lancet*, 1920, ii, 979.

[3] *Epidemic Respiratory Disease.* The Pneumonias and other Infections of the Respiratory Tract accompanying Influenza and Measles. By Eugene L. Opie, M.D., Professor of Pathology, Washington University School of Medicine, Francis G. Blake, M.D., Associate Member of the Rockefeller Institute for Medical Research, James C. Small, M.D., Bacteriologist, Philadelphia General Hospital, and Thomas M. Rivers, M.D., Associate in Bacteriology, Johns Hopkins University. London: Henry Kimpton. 1921. (Med. 8vo, pp. 402; 33 figures. 36s. net.)

bronchiectasis, and chronic pneumonia. In an appendix the Commission summarize the positive results obtained in their experimental inoculation of monkeys with the influenza bacillus and micro-organisms isolated from influenzal pneumonia.

TREATMENT OF SURGICAL TUBERCULOSIS.

This volume,[4] amounting in space to some 276 pages, deals essentially with the clinical aspects and the treatment of bone and joint tuberculosis. The contents of the book may be divided into two sections; one, the larger, is concerned with the case histories and clinical features of the diseases; the other, and it is of great interest, records certain methods of treatment to which the author has given special attention.

In regard to the first section there is little to be said; it deals with ground that has already been traversed by others. Dr. Eugen Kisch has not succeeded in throwing fresh light upon any particular problem. The various subjects are presented, however, in a lucid and attractive manner; throughout the strongest claims are put forward for conservatism and the limitation of operation.

The section which records special methods of treatment is of greater interest. Dr. Kisch begins by alluding to the imperfections of the present methods of treating surgical tuberculosis—the surgical method of elimination, and the conservative method of rest and fixation. He recounts the disadvantages of both, and then describes the advantages of Bier's methods, and from Dr. Kisch's statements one gathers that Bier has considerably modified them with corresponding improvement in results.

Several chapters are devoted to heliotherapy, and the problem of pigmentation receives detailed attention. Various theories are stated and discussed: Kisch believes that the heat rays are responsible for skin pigmentation, and that the ultra-violet rays, while they give rise to reddening and faint brown coloration, do not produce real pigmentation. Heliotherapy and radiation owe their value, Kisch thinks, to the hyperaemia which such treatment induces, and he records experiments in which blood pressure readings gave estimations of the degrees of hyperaemia induced. Since heliotherapy at high altitudes—as practised by Rollier at Leysin, for example—must necessarily remain an advantage of the few, Kisch has endeavoured to supplement it in the interests of the majority by certain special methods of radiation which he describes. Heat rays may be produced by the oxy-acetylene flame, ultra-violet rays by the use of a quartz lamp, the interior of the lamp being filled with mercury vapour. More recently, however, he has been using an aureole lamp backed with a powerful reflector. Both local and general raying are carried out, specially large types of aureole lamps with cluster burners being used for the latter process. Kisch gives the following directions:

> "We always begin with three minutes' raying at a distance of 150 cm. from the lamp. Next day this is increased to five minutes, and next day five minutes more, and so on to thirty minutes. Then the distance is diminished by 25 cm. and, when this is done, the raying has to last ten minutes only, and this is daily increased as before to thirty. The distance is then further reduced to 100 cm. for ten minutes, and increased as before to thirty minutes. General raying is never done at closer range than 100 cm., but local foci are rayed at a distance of 75 cm."

In addition to the heliotherapy and radiation, there are two special methods of treatment which Kisch employs—congestion treatment and the administration of iodine. The former treatment is carried out on the lines laid down by Bier—it is applied for periods of four hours three times a day, with one hour's interval between each application. The iodine is administered in the form of sodium iodide.

Kisch does not believe in complete and prolonged fixation in the treatment of tuberculous joints; at regular intervals during the period of rest and extension movements of the affected joint are carried out. He hopes thus to prevent atrophy of muscles and diminish the chance of ankylosis, and thinks there is little risk of lighting up the disease.

The book is well illustrated and the type is excellent; a complete index is supplied. It is an excellent contribution to the study of surgical tuberculosis, and the general section contains a number of very suggestive and helpful points; the book will well repay careful perusal.

AN AMERICAN TEXTBOOK OF PSYCHIATRY.

Dr. A. C. Buckley, the Medical Superintendent of Friends Hospital, Frankford, and Associate Professor of Psychiatry in the University of Pennsylvania, has written a comprehensive guide to the study of mental disorder, entitled *The Basis of Psychiatry*.[5] The subtitle of this volume, *Psycho-biological Medicine*, indicates the psychiatric outlook of the author. He points out in the preface that a change in the direction of approach to the problem of mental disorder has come about through the development of a closer relationship between biology and psychology; that mental disorders are not primarily mental diseases, but reflections of some bodily disorder which through its effect upon the organ of adjustment—the nervous mechanism and its lower and higher (psychic) reflexes—prevents the patient from making appropriate adaptations to environmental conditions; that the reactions of the individual as a whole form the subject underlying every problem in psychiatry; and that before any conclusion can be reached from the standpoint of diagnosis, prognosis, and treatment of the mental condition there must be a thorough investigation of all bodily functions. Such views are thoroughly sound, and the author keeps them well in the foreground of his descriptions of the various forms which mental disorder assumes. The importance which he ascribes to biological conceptions for our fuller understanding of mental disorders leads him, in the earlier chapters, to deal more fully with biological phenomena than is usual in most textbooks of psychiatry. Thus he discusses the fundamental vital characteristics included under the term *reaction*; the development of the nervous system; conditioned reflexes; the laws of inheritance; and the development of the brain and receptive organs, and applies these various data in subsequent chapters to illuminate the problems of insanity in respect to causation and symptomatology.

The chapter on methods of examination includes a useful account of laboratory diagnostic procedures, and Part II of the volume, devoted to a description of the various types of mental disorder, is clearly written and generally adequate for the needs of the student. We do not quite understand, however, why the author has purposely omitted any description of the various forms of congenital deficiency. Apart from the fact that this group of cases would have afforded him an excellent opportunity for illustrating the basic principles upon which his conception of mental disorder is founded, it is of great importance that the student should be thoroughly grounded in this aspect of psychiatry. It might reasonably have been expected that a volume so large as this would have included a comprehensive account of the methods of estimating the intellectual level, such as the Binet-Simon tests. A useful glossary of biological, psychological, and psychiatric terms is appended. Each chapter includes a number of references to the literature of the subject with which it deals, and these will be found of distinct service to those who wish to gain a fuller knowledge of the subject. The author has a thorough acquaintance with the work of English psychiatrists, and frequent references are made to the researches of Bolton, Mott, Head, and others in this country. In general he follows the teaching of Tanzi, Bianchi, Regis, and Kraepelin in relation to mental disorder.

HOWARD MARSH.

St. Bartholomew's men of the last quarter of the last century, and many others, for he had innumerable friends, will welcome *A Memoir of Howard Marsh*,[6] consulting surgeon to that great hospital, and subsequently professor

[4] *Diagnostik und Therapie der Knochen und Gelenktuberkulose; mit besonderer Berucksichtigung der Theorie und Praxis der Sonnenbehandlung.* Von Dr. med. Eugen Kisch. Leipzig: F. C. Vogel. 1921. (Imp. 8vo, pp. xx+276; 6 plates, 361 figures. M. 120; bound, M. 140.)

[5] *The Basis of Psychiatry* (*Psycho-biological Medicine*). A Guide to the Study of Mental Disorders for Students and Practitioners. By Albert C. Buckley, M.D. Philadelphia and London: J. B. Lippincott Company. 1921. (Med. 8vo, pp. xii + 447; 78 figures. 30s. net.)

[6] *A Memoir of Howard Marsh, F.R.C.S., D.Sc., M.A., Surgeon to St. Bartholomew's Hospital, sometime Master of Downing College.* By V. S. M. London: John Murray, 1921. (Pp. 86, with portrait, price 5s. net.)

of surgery and Master of Downing College, Cambridge, by V. S. M. Coming of an East Anglian farmer stock, he was christened Frederick Haward, but changed the latter to Howard, and as Howard Marsh was known to many generations of students, who regarded him as pre-eminently their friend; for, his ward sister writes, to spare others' feelings was an instinctive reflex with him. His active association with St. Bartholomew's covered a period of forty-five years, and an interesting picture is drawn of the conditions of hospital life sixty years ago, when surgeons were in a decidedly inferior position, both professionally and socially, to physicians. Though a general surgeon and much influenced by his neighbour by birth, Sir James Paget, whose private assistant he was for some years, Howard Marsh foreshadowed the modern vogue of specialism by his attention to surgical diseases of joints, and especially the tuberculous affections of bone, being probably attracted to this subject by his association first as resident and then as a member of the visiting staff of the Hospital for Sick Children, Great Ormond Street. At St. Bartholomew's he served a long and laborious apprenticeship; he became assistant surgeon in 1873, but it was not until eighteen years later that he became full surgeon, a post he resigned shortly before he reached the compulsory age for retirement at 65.

But in this year (1903) he was elected professor of surgery at Cambridge, in succession, after an interval of seven years, to Sir George Humphry, the first incumbent of that chair, who had died in 1896, after holding it for thirteen years. This post of honour was not without its difficulties, and these, by wise tact, Marsh overcame successfully, as Sir German Sims Woodhead shows in a critical appreciation of his work at Cambridge. It is probable that the twelve years in the atmosphere of a university with traditions so different from those of a busy London consultant were the happiest of Marsh's life, and he certainly never spared himself in performing his duties, some of which, such as the first Commissioner of Scouts in Cambridge, must have been somewhat novel. The secret of his success in life was said to be his power of concentration on whatever he undertook; but his kindly nature and broad-mindedness must not be forgotten, and probably exerted considerable weight in his election, only four years after his arrival, as Master of Downing College. How he played his part is well set forth in this "short story of a man greatly beloved."

NOTES ON BOOKS.

To the authors of the *Essentials of Physiology*[7] are due hearty congratulation on the appearance of another edition of their useful compendium within a year. The present issue, apart from a few alterations in the text and the addition of a number of new figures, has undergone but little change. The book gives a most succinct and readable account of the facts of physiology.

Dr. BURNET'S *Materia Medica*[8] is a cram-book for students who find—as the author observes they commonly do—the subject of materia medica a bugbear. It consists of an alphabetical list of the commoner drugs, together with a mention of their chief features and lists of the preparations in which they are employed. At the end of the book are notes on prescription writing. Experience seems to show that cram-books are indispensable, and if ever they are justified it is in such a subject as this. Dr. Burnet's volume should be of service.

The second edition of the excellent textbook of *Microbiology*,[9] edited by Professor MARSHALL, was reviewed at some length in the BRITISH MEDICAL JOURNAL of October 25th, 1919 (p. 531). The third edition, revised and enlarged, is now before us and may be warmly recommended to readers of all classes who are interested in the study of bacteriology in any of its many various applications.

The late Professor LÖWIT'S textbook on infection and immunity,[10] edited by Professor BAYER, may be recommended to bacteriologists in search of a straightforward and uninspiring German account of the subject with which it deals. It is a laborious compilation, based mainly on the German literature of the subject, and doing scant justice to the pioneer work of men of science outside German and Austrian laboratories.

Fired by the literary activity of surgeons who publish their works in the form of annals, collected papers, surgical clinics, and the like, Dr. PRESNO Y BASTIONY of Havana has printed a volume of surgical clinics and operative technique,[11] in which he has collected some sixteen papers communicated by him to the scientific societies of Havana or to its review of medicine and surgery. The volume is well got up and illustrated, and gives evidence of the surgical skill and literary accomplishment of its author. It should be of interest to the surgical specialist and gynaecologist.

Hints to Travellers,[12] scientific and general, edited for the Council of the Royal Geographical Society by its map curator and instructor in surveying, Mr. E. A. REEVES, has now as the result of its deservedly recognized utility reached a tenth edition. Of its two volumes the first and larger is devoted to surveying and practical astronomy, and contains imposing tables of the logarithms of numbers; so well has the ninth edition stood the test of years that no serious alterations have been necessary. In the second volume, however, more changes have been required; the notes on photography have been thoroughly revised by the late Mr. J. McIntosh, Secretary of the Royal Photographic Society of Great Britain, and the other sections have also been submitted to careful revision. The advances of tropical medicine have led to what is practically a rewritten article on medical hints by Dr. Andrew Balfour, Director-in-Chief of the Wellcome Bureau of Scientific Research, though parts of the original article by the late Dr. W. H. Crosse still remain. The hundred and thirty pages thus occupied contain an immense amount of practical information in simple common-sense language. The ideal traveller is defined as a temperate man, with a sound constitution, a digestion like an ostrich, a good temper, and no race prejudices. From experience in many tropical countries Dr. Balfour recommends a flannel cholera belt at night only, and, even so, chiefly in dry desert climates where there is a great difference between the day and night temperatures. An abdominal belt, by the gentle support it provides, is also useful in sea-sickness, in which affliction Dr. Balfour has found that sucking a lump of loaf sugar containing three or four drops of chloroform often prevents vomiting.

The *Essentials of Veterinary Physiology*,[13] by Professor NOËL PATON and Dr. ORR, first published in 1905, is now in its third edition. It is a book designed to meet the requirements of students and practitioners of veterinary medicine, supplementing the demonstrations or practical work from which alone physiology can be properly learned, as the authors very wisely point out. The volume is subdivided into appropriate parts and sections on lines that are not unusual. The text is clearly and dogmatically written, with an economy of words that will appeal to the intelligent and well-found student. The authors assume a fair knowledge of chemistry and physics in their readers, but insert brief and highly concentrated appendices on elementary physics and organic chemistry for the benefit of those who are less well-grounded in their elementary training. The text is full of information, and the whole volume is adequately illustrated. It may be warmly recommended to those for whom it is written.

The issue of *Medical Science, Abstracts and Reviews* for September completed the fourth volume, and a double index (subjects and authors) to that volume is published with the issue for October.

[7] *Essentials of Physiology.* By F. A. Bainbridge, M.D.Cantab., D.Sc.Lond., F.R.C.P., F.R.S., and J. A. Menzies, M.A.Dunelm, M.D.Edin. Fourth edition. London and New York: Longmans, Green and Co. 1920. (Demy 8vo, pp 497; 195 figures. 14s. net.)

[8] *Materia Medica, with Notes on Prescription Writing.* By J. Burnet, M.A., M.D., B.Ch., M.R.C.P.Edin. London: J. and A. Churchill. 1921. (Cr. 8vo, pp 80. 4s. 6d. net.)

[9] *Microbiology: A Textbook of Micro-organisms, General and Applied.* Edited by C. E. Marshall. Third edition, revised and enlarged. London: J. and A. Churchill. 1921. (Demy 8vo, pp. 1071; 200 figures. 21s. net.)

[10] *Infektion und Immunität.* Von Dr. M. Löwit. Nach dem Tode des Verfassners herausgegeben von Prof. Dr. G. Bayer. Berlin and Vienna: Urban and Schwarzenberg. 1921. (Sup. roy. 8vo, pp. 558; 2 plates, 33 figures. M.80; bound, M.120.)

[11] *Clínica Quirurgical y Técnica Operatoria (1915–1919).* Dr. J. A. Presno y Bastiony. Habana: Imprenta "El Siglo XX." 1920. (Demy 8vo, pp. 311; 61 figures.)

[12] *Hints to Travellers, Scientific and General.* Revised and corrected. Edited from the ninth edition by E. A. Reeves, F.R.A.S., F.R.G.S. London: The Royal Geographical Society. 1921. (Vol. i: Cr. 8vo, pp. xv+470, 94 figures, map in pocket; Vol. ii: Cr. 8vo, pp. vii+318, 30 figures. Price of the two volumes, 21s.; to Fellows, at the Office of the Society, 15s.)

[13] *Essentials of Veterinary Physiology.* By D. Noël Paton, M.D. B.Sc., LL.D., F.R.S., and J. B. Orr, D.S.O., M.C., M.A., M.D., D.Sc. Third edition, revised and enlarged. Edinburgh: W. Green and Son, Ltd. 1920. (Roy. 8vo, pp. 692; 246 figures. 25s. net.)

APPLIANCES AND PREPARATIONS.

A Hot-air Sterilizer for Steel Needles.

Dr. A. G. Shera (Clinical Pathologist, Princess Alice, Ear and Eye Hospitals, Eastbourne) has designed an apparatus for sterilizing steel hypodermic needles. It is intended for the conservation of steel needles in hospitals, in the consulting room, and also especially for venereal disease clinics where a number of fresh sterile needles are required in series. It consists of a tripod nickel-plated steel sterilizer 8.5 in. high with an upper chamber 3 in. by 2.75 in. In the upper chamber is a carrier supporting a bottle of forty needles held up by their hilts in open glass tubes, the points being free. The bottle is one-third filled with fresh liquid paraffin. Heat is supplied by a spirit lamp below, and sterilization occurs in twelve to fifteen minutes, and is shown by a gentle tinkling of the boiling paraffin which occurs at 118° C. The bottle is then lifted out by a lifter which is attached to the carrier, and then is used or transferred to its case for transit. Resterilization of the bottle when once opened is not necessary if due asepsis in extracting needles is observed. The wholesale makers are Messrs. R. B. Turner and Son, 9–11, Eagle Street, Southampton Row, W.C.1. An Arkansas stone and a leather case containing also a bottle of liquid paraffin and a spare needle bottle are supplied optionally.

INTERNATIONAL ASPECTS OF ALCOHOLISM.

With Special Reference to Prohibition in America.

Sir Arthur Newsholme, K.C.B., M.D., F.R.C.P., late Principal Medical Officer to the Local Government Board, delivered the Ninth Norman Kerr Memorial Lecture before the Society for the Study of Inebriety on October 11th. The chair was taken by Sir Alfred Pearce Gould, President of the Society.

The lecturer said that the subject on which he had promised to speak was obviously too vast to be dealt with in the course of an hour's talk. The real title of the lecture ought, he thought, to be American Prohibition and its Relations to the Problem of Public Control of Personal Conduct. He first gave the history of the steps which led to the passing of the Eighteenth Amendment of the Constitution of the United States, giving the details of the votes in its favour at various stages. Total prohibition was the culmination of the efforts of nearly a century. The history of Great Britain showed that it was common ground that the sale of alcoholic drinks required to be made the subject of restrictive measures. In the United States there had been waves of advance and retreat in the local enforcement of prohibition, the area under prohibition increasing as time went on. Advance in prohibition had been rendered easier by repeated legal decisions to the effect that breweries, distilleries, and saloons were subject to the police powers of the State, and that prohibition was not confiscation but only deprivation of a privilege. The following motives and factors leading to American national prohibition were discussed: the active propaganda of the Anti-saloon League, the instruction respecting alcohol in elementary schools, the desire for "clean" politics, the desire to make State and township prohibition successful, the strong lead of the American medical profession.

The following resolution was passed in 1917 by the American Medical Association:

> "Whereas we believe that the use of alcohol as a beverage is detrimental to human economy, and whereas its use in therapeutics as a tonic or a stimulant, or as a food, has no scientific basis, therefore be it resolved: That the American Medical Association opposes the use of alcohol as a beverage; and be it further resolved, That the use of alcohol as a therapeutic agent should be discouraged."

Other factors were the determination to secure industrial efficiency, and the desire to save white women from negroes inflamed by drink. The results of the first year of national prohibition were admittedly only partial, partly because in the main only Federal, and not also State and city, and partly because of the wide Canadian and Mexican borders, over which smuggling at first was easier even than it was from overseas. The domestic manufacture of alcoholic drinks had increased, but this was a small offset to the general result. For the vast majority of the population alcoholic drinks had become unobtainable or too expensive to be indulged in frequently. There was in America evidence of increased prosperity and of the diversion of large sums of money to the purchase of better clothing, and so on, which was, partly at least, due to the saving on alcohol. Rescue work in large cities had been largely replaced by preventive work. Drunkenness and admissions to hospitals from acute alcoholism showed remarkable declines. Though alcoholism was often but one part of a mesh of evil circumstances, the short cut towards the removal of that evil which prohibition provided promised to be successful in diminishing disease, poverty, and crime.

There remained the general question whether prohibition was likely to exercise a sinister influence on the moral fibre of the people, encouraging other "prohibition cranks" to enter the field. Sir Arthur Newsholme regarded such fears as fantastic, government by majorities forming an adequate protection. The notion that prohibition was the cause of law-breaking and perjury had no better foundation than similar notions in regard to other prohibitions—for example, the prohibition of smuggling. Much stress had been laid on the argument from analogy, to the effect that, as in the cases of railways and automobiles, regulation short of prohibition was indicated as the appropriate method of procedure. No point of principle was involved. Each case—as, for instance, that of public gambling—must be decided on its merits. No pedantic consistency could be expected in regulations affecting personal conduct; but in a democratically governed country the sale of an article for consumption would probably never be prohibited unless its consumption could be shown to the satisfaction of a large majority of the people to produce mischief on a scale justifying the limitation of enjoyment on the part of a large portion of the population. Admittedly moral suasion and individual initiative were healthier and more valuable motives for securing temperance than prohibition; but prohibition might be justified if the evil of intemperance was great, and if the success of those motives could be secured only after many years, or even after generations, of suffering from alcoholism. The case in favour of the enforcement of prohibition was rendered stronger when a large majority of the people persistently demanded it, and when it became clear that prohibition could be enforced.

The problem of prohibition had an important bearing on the fundamental question of how liberty and authority were to be reconciled. The lecturer made this problem the subject of an historical review, and showed the evolution of the present ideal, which was rather one of the liberation of large groups of the community from oppression—parental, social, industrial or political—than of personal liberty, which might easily become licence. He then showed the extent to which communal life had necessitated police restrictions, Poor Law obligations, interference in industrial relations and in the parental control of children, and had produced severe differential taxation, and he then proceeded to illustrate the ways in which coercion had led to extended liberty. The inequality of men, mentally as well as socially, formed a strong reason for judicious regulation. In conclusion, he stated, first, that compulsion was a necessary element in government; secondly, that success in government could be permanent only with the consent of the governed; thirdly, that democratic government was government by majorities; fourthly, that majority government was practicable and beneficial to society only when the welfare of the majority was given priority over personal liberty; it failed if a large minority demanded the privilege of disobeying laws which ran counter to their own appetites or opinion; fifthly, that there were, in civilized countries, many examples of enactments involving diminished freedom of action for the many in order to protect the few; sixthly, that in all such instances moral and voluntary action was preferable to compulsory action. The case for compulsion, which was a good case, was that moral suasion acted slowly on minorities, and, meanwhile, multitudes of innocent persons continued to suffer, and the community suffered in pocket and in efficiency.

The Chairman, in proposing a vote of thanks to the lecturer, said that Sir Arthur Newsholme's residence of two years in America since he ceased to be able to serve this country in his old position had given him very special means of becoming intimately acquainted with the subject. He had lived in one of the great centres of education, with the best means at hand of learning the real facts about it, and he (the Chairman) was sure that the Society and all of those who were present were very much indebted to him for undertaking to tell them of his experience of the great experiment in America. He had told them how prohibition presented itself to his experienced, scientific, acute mind—a mind deeply versed in the intricacies of public health and municipal administration, and in so doing he had really conferred a very great benefit on this country.

BELLAHOUSTON HOSPITAL INQUIRY.

The Committee appointed in May by the Minister of Pensions to inquire into the management of Bellahouston Hospital, Glasgow, on grounds that were referred to in our issue of June 11th (p. 872), issued its report on October 15th. The hospital was managed by the Ministry of Pensions and the Joint Disablement Committee for the South-West of Scotland. The appointment of the Committee followed questions asked in Parliament by Mr. Neil Maclean, M.P. for Govan, and correspondence in the press in which allegations were made against the administration of the hospital and the treatment of patients, particularly in the out-patient department. The chairman of the Committee was Lord Scott Dickson, Lord Justice-Clerk of Scotland, the other members being Sir Donald MacAlister, President of the General Medical Council; Mr. C. M. Douglas, a member of the Joint Disablement Committee for the South-West of Scotland; Mr. William Grieve, late sergeant Staffordshire Yeomanry, a disabled ex-soldier; and Colonel Sir Arthur Lisle Webb, Director-General of Medical Services, Ministry of Pensions. The report, which is unanimous, may be summarized in three sections, affecting respectively the out-patient department, the discharge of in-patients, and the administration of the hospital.

Out-patient Department.

The most important complaints appear to have arisen from the large number of discharges of patients which took place from February 5th to 12th, 1921, when 953 patients, or about 50 per cent. of those on the out-patient list, were dismissed: 706 were considered fit for work and not requiring further treatment, 79 were sent to special clinics, and 30 were sent for admission as in-patients, the remainder being accounted for by what are termed "automatic discharges for non-attendance." A new medical superintendent of the hospital, Colonel A. R. Henchley, D.S.O., M.D., had been appointed on January 18th, and he was immediately struck by the extraordinary condition of the out-patient department, crowds of men collecting sometimes as early as 7.30 a.m.; there was a long waiting queue of patients, and there was no doubt, he stated to the Committee, that the accommodation was totally inadequate to the numbers attending. He therefore, with the aid of his medical staff, examined and reclassified the out-patients. The Committee says in its report:

> "Unless we are to challenge the capacity or truthfulness of the medical men who conducted this examination and appeared before us, it is impossible, in our opinion, to discredit the results at which they arrived. We find no sufficient grounds for making such challenge. On the contrary, we believe the examination was honestly and carefully conducted."

Of the cases discharged between February 5th and 12th, 2 were readmitted as in-patients, 6 as out-patients, and a total of 57 to institutions within the area, but it is pointed out that this may have been largely for conditions which did not come within the consideration of the staff at Bellahouston Hospital, conditions due to military service alone being within their province. The Committee concludes:

> "In our opinion, the out-patient department was towards the end of 1920 in an unsatisfactory condition. In February, 1921, it was thoroughly reorganized, and, as appears from the subsequent charts, the numbers in attendance were brought within practical limits. This was done by Colonel Henchley, the medical superintendent, with the assistance of the other members of the staff, and it was work which quite legitimately fell within the scope of Colonel Henchley's duties as medical superintendent to initiate and carry out. The department is now in good working order."

Discharge of In-patients.

Dealing with the circumstances connected with the discharge of nearly 300 in-patients from Bellahouston Hospital in April, 1921, the Committee points out that the questions connected with the discharges arose out of the industrial strike crisis. The coal supply had been causing some anxiety, and as the result of a conference the Commissioner of Medical Services telephoned to the medical superintendent, not only of Bellahouston, but of all the larger Pension Ministry institutions, asking them to get the respective staffs to review the cases and to send those patients home who could go without detriment to themselves, for a definite period of home treatment for one, two or three weeks. The patients so sent home were to be recalled earlier if the crisis passed away sooner. The Committee states that, in its opinion, this duty was carried out by the visiting and resident staff in the most careful and sympathetic way; no patients were forced to go home, and they went on full treatment allowances, and knew that they were going home for a brief and limited period. From the patients' point of view there is, states the report, no foundation for any suggestion that what was done in what was admittedly a time of great crisis caused an injury or hardship to any patient. What was done was done on the initiative and instructions of the Regional Director, without consultation or notification to the Joint Disablement Committee, and, having regard to the state of friction which existed, the Committee thinks that this was unfortunate and that a frank disclosure and discussion might have prevented the controversy which arose.

The Committee next referred to the letter of Sir Charles Cleland, Chairman of the Joint Disablement Committee, to the Secretary of the Ministry of Pensions, which we quoted in our columns on June 11th (p. 872); the most important allegations in it were that amongst the 300 patients discharged from Bellahouston were some who had been prepared for immediate operation, and that because the necessary forms had not been in many instances properly completed, treatment allowances could not be paid, and much unnecessary suffering and hardship to the pensioners consequently ensued. Sir Charles Cleland declined to give evidence, and the Committee says that it does not know on what information he felt himself warranted in making and publishing a statement involving such a serious allegation against surgeons of eminence and repute in their profession.

> "In our opinion," states the Committee, "the allegation is entirely untrue, and one which should never have been made, and we desire to express our sympathy with the professional men regarding whom such a serious allegation has been so publicly and, as we think, so unjustly made."

Complaints as to Administration.

The third part of the report relates to various complaints dealing with hospital administration and with incidents connected therewith. The Committee says that many witnesses were examined in support of numerous complaints of very varied kinds, and if the statements as to these complaints were to be accepted as well founded, "there was very little, if anything, that was right connected with Bellahouston Hospital. That, indeed, seemed the impression desired to be produced in the minds of the Committee." The Committee was satisfied that the value of the hospital and of the treatment given there to the in-patients were highly appreciated by the vast majority of the patients. As to "the house doctors and sisters making life miserable for the men," as one witness said, apart altogether, states the Committee, from the personal character of those so charged as members of honourable professions, which would require evidence of a very different kind from any that had been submitted to disparage or destroy confidence in their fitness for the positions they held, it would be impossible for such a state of things to have existed, much less continued, without its having become known to the visiting committee, the senior medical staff, and the matron. The facts that Bellahouston Hospital has largely to combine the functions of a convalescent with that of a curative institution, that its patients therefore enjoy greater freedom from ordinary hospital discipline and restraint, and that admission to and residence in its wards are attended with certain pecuniary advantages extraneous to its medical functions as a place of treatment, have made it, in the opinion of the Committee, much more difficult to manage satisfactorily than an ordinary general hospital for the relief of the sick and injured. The Committee see no reason "why any of those who are more immediately interested in its patients should cease to continue to it the confidence which, in their opinion, the great majority have hitherto placed in it."

Professor H. Curschmann has succeeded Professor Martius as director of the medical clinic of Rostock University, where Professor Uhlenhuth, formerly of Strasbourg, has been appointed director of the Institute of Experimental Medicine.

British Medical Journal.

SATURDAY, OCTOBER 22ND, 1921.

WILLIAM HARVEY, OBSTETRICIAN.

The fame of Harvey's book on the circulation of the blood is so great that the fact that he was the author also of a great book on the reproduction of animals is not always remembered. Even when the fact is borne in mind the recognition of it is often coupled with the depreciatory comparison that the former has the glory of the sun whilst the latter has only that of the moon. But the comparison is hardly just if it is intended to suggest that the latter shines only by reflected light. The *De Generatione Animalium* is in itself light producing, and if the *De Circulatione* owes little or nothing to borrowed rays, the same may be said of its less known companion. It is an interesting coincidence, too, that both works appeared in English for the first time in the same year (1653). When, therefore, Harvey's contribution to physiology is reviewed, as it so regularly is, there is reason for the occasional selection of his contributions to obstetrics and embryology for appreciative remembrance.

There was thus appropriateness in the choice which the President of the Royal College of Physicians of London made when he nominated Dr. Herbert R. Spencer to deliver the Harveian Oration for 1921. It was timely also, for nearly fifty years have passed since to another obstetrician (Dr. Arthur Farre, in 1872) this honour was accorded; it was also appropriate, for no one could be expected to fulfil the duties of Harveian Orator with a greater equipment of knowledge and a greater grace of communication than the Obstetric Physician of University College Hospital. Dr. Spencer has not disappointed expectations in dealing with Harvey as "obstetric physician and gynaecologist"; the perusal of the Oration yields proof of the wisdom of the President's selection.

Dr. Spencer has skilfully reproduced the atmosphere of student life in Padua at the beginning of the seventeenth century. Harvey was there as a medical student between the years 1600 and 1602; and it was then that the foundations were laid of the anatomical and obstetrical knowledge on which he afterwards builded so firmly and so extensively. The house of the university—the Gymnasium omnium Disciplinarum—was undergoing some reparations in 1601; under Harvey's eyes therefore; in its quiet cloisters, "in two tiers," the young English student would spend many hours, for, wrote Aubrey, "he was always very contemplative, and said he did delight to be in the dark, as he could then best contemplate." Aubrey gives the picture of him in his own way, as "of the lowest stature, round-faced, olivaster (like wainscott) complexion, little eie, round, very black, full of spirit, hair black as a raven." In the Canterbury portrait by Janssen, reproduced as a special plate this week, we can see something of what Aubrey means—the eye keen, and the face and attitude very "full of spirit." But the men of Padua, and especially the teachers, would mean more to Harvey than the cloisters. In later life Harvey amused his leisure by studying mathematics, and it is safe to assume that when a young student in Padua he went to see and hear the great Galileo, then professor of that subject, and himself once a medical student too (using his pulse for timing the oscillations of the swinging lamp at Pisa and so founding his pendulum law). Harvey would hear much, too, of the great teachers of anatomy and obstetrics whose lives had just closed. Vesalius was dead some thirty-six years past, but his book *De Corporis Humani Fabrica*, with its first adequate description of the pelvis, was there for his study, and from him he would learn of the changes in the uterus in pregancy, of the foramen ovale, and of the respiratory movements of the foetus in the membranes. Of Falloppius also he would hear, and of the tubes which still bear his name, notwithstanding the recommendations of the Basle Anatomical Nomenclature Conference; perhaps he may have wondered as to the nature of the follicles and corpora lutea in the ovaries which Falloppius had discovered. Naturally, however, the Paduan teachers who were active in the years during which Harvey attended the University would influence his thought most. There was Saxonia, the professor of practical medicine, who wrote treatises on the diseases of women and conception; there was Falloppius's successor, Fabricius ab Aquapendente, professor for about fifty years; he will have pointed Harvey along the way of comparative embryology; there was Casserius, great as a dissector, who, though poor, employed artists to draw for him; there was Spigelius, whose work on the foetus is quoted by Harvey; there was Mercurialis, the rich Knight of St. Mark, who wrote on diseases of women among other subjects; and lastly, there was Mercurius (Scipione Mercurio), the writer of *La Comare*, the first Italian work upon midwifery.

Living amidst such influences in the most impressible years of his life, it would have been surprising had Harvey not felt their impact; as a matter of fact he returned to England to study the generation of animals in the hen's egg and in the deer, to gain for himself the designation of the Father of British Obstetrics by writing the first original English work on midwifery, and to practise, with a brilliance vouched for by Dr. Percivall Willughby, as an obstetrician and gynaecologist.

How great and real Harvey's knowledge of midwifery was the Harveian Orator had no difficulty in proving, and everyone will join in his regret that the "Medicinal Observations" have been lost, as completely, it would seem, as the missing books of Livy (also a Paduan). But the great work *De Generatione Animalium*, containing the section "De Partu," remains for anyone to read. It was, indeed, a happy chance that sent Dr. George Ent to visit Harvey that Christmas Day in 1650 and let him bring away in his pocket (for publication) the manuscript entitled "Exercitationes de Generatione Animalium, quibus accedunt quaedam de Partu, de Membranis ac Tumoribus Uteri et de Conceptione." Dr. Spencer refers to many noteworthy observations which lay in that manuscript, and there are others which will well repay consultation by the present-day obstetrician. Without the compound microscope, and with only a "perspective glass" to help him, it is little short of a miracle that Harvey saw so much and was able to advance embryology so far on the path it has ever since pursued. Dr. Spencer passes rather lightly over Harvey's enunciation of the great doctrine of epigenesis in embryology; but full credit had already been given to him by Dr. W. K. Brooks[1] for this truly remarkable and far-sighted conclusion, in which he anticipated Caspar F. Wolff by about a hundred years. His great phrase "Ex ovo omnia"—to be read on the egg Jove has opened in the drawing reproduced at page 621, which formed the frontispiece to the

[1] *Johns Hopkins Hospital Bulletin*, 1897, viii, 167.

Latin edition—was a splendid generalization which should never be forgotten. Harvey appealed to observation of nature and experiment, and was in that respect a modern of the moderns. "Nature herself," he wrote, "must be our adviser; the path she chalks must be our walk." *Sic itur.*

WAR AND POPULATION.

An evidently well-informed correspondent contributed to the *Times* of September 23rd an instructive comparison between the German censuses of 1910 and 1919, and, since the changes in our population must be of the same kind, the conclusions drawn from the German figures are applicable to ourselves. One consequence of the war, a vast increase of the excess of women over men in the age group 20–45, and its bearing upon the rate of natural increase, has already been noted and perhaps for the present sufficiently discussed. The vital-statistical implications of another change deserve mention. The correspondent points out that the proportion of persons aged 45–65 has necessarily increased; according to his figures, out of 10,000 of the population in 1910, there were 592 males aged 45–60 and 643 females in the same age group. The corresponding values in 1919 were 712 and 749, a 20 per cent. increase for males and a 16 per cent. increase for females.

If one compares the vital statistics of urban areas with those of rural districts in any one country or those of an industrial nation with those of a non-industrial nation, the industrial country, as a rule, compares most favourably with the agricultural country during later childhood, adolescence, and young manhood, and least favourably at the epoch of later maturity, between, say, 40 and 60. Most industrial countries do badly in the first year of life as well, but that is for reasons which we have not now to discuss. This phenomenon of unfavourable mortality between 40 and 60 is, as Dr. Stevenson noted in his last decennial review, very readily observable in our own statistics, and it would not be a serious exaggeration to say that our mortality at mature ages is very unfavourable. For instance, while the mortality of males aged 45–55 in England and Wales had only fallen from 19.2 per 1,000 in 1846–50 to 15.5 in 1906–10, the corresponding rates in Sweden had changed from 22.6 to 10.9. Since 1860 Swedish mortality in this age group has always been less than ours. The story of death rates at earlier ages is very different. In 1861–65 English males aged 15–20 died at a much faster rate than Swedish males, 6.4 against 4.5. In 1906–10 they died at a much slower rate, 3.0 against 4.3. In the latter quinquennium the death rate in the registration county of Lancashire was smaller than for all Sweden at ages 15–20; not far short of double the Swedish rate at ages 45–55.

In other words, the war has increased the relative proportion of precisely that age group upon which existing conditions of life in an industrial country bear hardest. It is a matter well worth inquiry whether our failure to control the mortality of middle age is inevitable. The peculiarities of urban mortality rates have often been discussed; much importance has been attributed, and rightly attributed, to the factor of migration, both external and internal. Yet this cannot be the whole explanation. If, for instance, the very unfavourable mortality of Sweden at young adult ages were due to the emigration of healthy males—and Sweden is a country which has an outward balance of migrants—we must explain on other lines her steadily declining mortality at maturity.

The *post hoc ergo propter hoc* argument is never more dangerous than when applied to secular changes of vital statistics, yet the facts that the water-borne diseases which urban sanitation has controlled had a predilection for young lives and that, down to a very recent epoch, hygienic-industrial legislation chiefly concerned women and young persons does tempt speculation. The late Professor Sundbärg attached great importance to the decline in the use of alcohol as a factor of the reduction in Swedish mortality at later ages, but there seems to be some dispute as to the extent to which Swedish legislation has been responsible for the alteration of habits, and the discussion is one into which foreigners cannot profitably enter.

The point, however, that we wish to make is that the hygiene of middle life is a subject which deserves more attention than it has yet received and that the war changes in the constitution of our race emphasize the importance of the matter.

THE HARVEIAN ORATION.

On St. Luke's Day, October 18th, after Dr. Herbert Spencer had concluded the delivery, before the Royal College of Physicians of London, of the Harveian Oration, a report of which is published elsewhere in this issue, the Baly medal was presented to Dr. H. H. Dale, F.R.S., by the President, Sir Norman Moore. The medal is awarded every alternate year to the person who shall be deemed to have most distinguished himself in the science of physiology. The Moxon medal, which is awarded every third year to the person who is deemed to have most distinguished himself by observation and research in clinical medicine, was presented to the Right Hon. Sir Clifford Allbutt, K.C.B., F.R.S. The Weber-Parkes prize and medal, which is awarded every third year for the best work done in connexion with the etiology, prevention, pathology, or treatment of tuberculosis, was presented to Dr. Louis Cobbett. The Harveian dinner took place in the evening; the President, who was in the chair, gave the toast of the guests, who included the medallists, the Master of the Rolls (Lord Sterndale), Lord Ashton of Hyde, the President of the Royal College of Surgeons (Sir Anthony Bowlby), Sir Julian Corbett, Mr. Laurence Binyon, Dr. F. H. H. Guillemard, Sir Frederick Kenyon, K.C.B., Director of the British Museum, and Mr. John Sargeaunt, a scholar whose most recent work deals with the plants of Virgil. The two last-named responded. Sir Clifford Allbutt spoke in the name of the medallists, and Sir Humphry Rolleston gave the health of the Harveian Orator, which was duly acknowledged by Dr. Herbert Spencer.

THE CANTERBURY PORTRAIT OF HARVEY.

The portrait of Harvey printed this week on a special plate is from a picture not previously reproduced, which now hangs in the Board Room of the Kent and Canterbury Hospital. We are indebted to Dr. F. William Cock, whose authority with regard to all that concerns the history of his native county of Kent is unrivalled, for the assurance that the painting is almost certainly the work of Cornelius Janssen, who lived for six or seven years in Kent and painted many of the worthies of the county; Janssen even called himself Johnson, and got armorial bearings assigned to him when living in England. As the inscription on it shows, the picture was given rather more than a century ago to the Kent and Canterbury Hospital by Mr. G. Best, who was M.P. for Canterbury for a good many years. He was head of an old Kentish family of brewers, and lived at Chilston, Boughton Monchelsea. Dr. Cock believes that the Bests were connected with the Harvey family.

Some years ago the picture was in a bad state, but attention having been called to the matter, Lord Northbourne, the president of the hospital, had it very judiciously cleaned and restored by Mr. G. Hillyard Swinstead, R.I. To Lord Northbourne Dr. Spencer is indebted for permission to reproduce the portrait. Mr. Swinstead was allowed to make, for the Wellcome Medical Museum, a copy which may be seen there by those interested in the matter. Sir D'Arcy Power, in the essay on the *Portraits of Dr. William Harvey* which he prepared for the Historical Section of the Royal Society of Medicine,[1] when discussing the well known portrait in the large library of the Royal College of Physicians of London, about the authenticity of which there can be no question, states that there are several reputed portraits by Janssen, some of which may have been painted as replicas by one or other of Janssen's pupils. The Canterbury portrait resembles that preserved at Kingsweston, near Bristol, but is manifestly superior to it. The portrait at Kingsweston was placed there by Sir Robert Southwell, a President of the Royal Society, who married a niece of Harvey. Opinions will no doubt differ, but many will be inclined to agree with Dr. Cock that the Canterbury portrait of Harvey is the most striking and satisfactory that exists.

MEDICINE IN PUBLIC LIFE.

IN the JOURNAL of April 9th we gave an account of a speech at Exeter by Dr. Addison, then Minister of Health, on "Medicine in Public Life." Last week he revisited the large lecture theatre where he used to teach anatomy and gave an address on "Medical Men and Public Life" to the Abernethian Society of St. Bartholomew's Hospital. The themes being so much alike, and the audience wholly different, he may have been tempted to repeat himself, but, if so, he overcame the temptation. Free for the time being from the cares of office, Dr. Addison said little about large questions of public medical policy, and directed his remarks mainly to practical suggestions for winning success in a political career. His advice, in brief, to the medical parliamentarian, was to acquire a special training in some subject, to have plenty of outside interests, to know what he wants while concealing his aim, to cultivate the art of biding his time quietly, to avoid cut-and-dried ideas and bumptious people, and lastly, in regard to quarrels, to follow the maxim of Polonius. The House of Commons, he said, dislikes faddists and people with missions, political pot-boilers, and those who lecture to it; it respects a man who applies himself to a group of topics and gets them up thoroughly. Dr. Addison was a Minister throughout the whole period of the war, and in giving a few impressions of office he spoke of the gain to be derived from a medical and scientific training in the handling of national business. If this education did nothing else, it enabled a Minister to understand the language used by technical experts; but in fact scientific principles applied all round, and of this he gave several instances. Thus, the investigations he asked the Medical Research Council to make into trinitrotoluene poisoning, at a cost of two or three thousand pounds, led to a saving of millions of public money in pensions. Again, the problems set before the Industrial Fatigue Research Board were such as a medical Minister could grasp better than others. For those who aspired to ministerial rank Dr. Addison urged the cultivation of equanimity and the habit of storing cares and responsibilities in a system of water-tight compartments, the whole being closed at will on lying down to sleep; Cabinet office and insomnia are incompatibles. Further, a Minister should remember that the House of Commons is his master, and that our Civil Service is the best in the world; if reasonable and keen, he could always win the loyalty of his staff. In general the training of a medical man should enable him both to see and to take an opportunity with promptness and decision—qualities indispensable for success in political life. Dr. Addison ended an interesting address by stating his belief that the future holds immense opportunities for medical knowledge in the wise direction of public affairs.

[1] Oxford University Press. 1913.

GENERAL PRACTICE AND MODERN LABORATORY METHODS.

THE Clinical Society of Manchester has resolved to strike out on a new line and to devote its meetings in future to the demonstration and discussion of the latest methods of scientific investigation and their practical bearing on clinical medicine. The professors of anatomy, physiology, pathology, and pharmacology have been elected honorary members of the society and will co-operate with the committee by giving practical demonstrations of recent work in his department, so that its direct bearing on the practice of medicine may be jointly discussed by laboratory workers and medical practitioners. At the first meeting, which takes place in November, respiratory problems will be discussed, in relation more especially to the composition and chemistry of alveolar air. In January the professor of pathology will demonstrate the Wassermann reaction and other blood tests. In March a special meeting will be held at which an eminent physiologist will be invited to read a paper on the bearings of modern physiology on clinical medicine. In May the digitalis group will be discussed and demonstrated; the subject for the meeting in July is nerve injuries. The society was originally founded to meet the needs of general practitioners by giving them an opportunity of discussing unusual or difficult cases which from time to time come under their observation, and has endeavoured to put the clinical side of medicine foremost in all papers and communications at its meetings. The post-graduate clinical lectures which are now held in several hospitals in Manchester have rather diminished the scope of the society in this direction, hence the new departure, the result of which will be awaited with much interest, for it will undoubtedly influence the policy of medical societies in other centres. We are disposed to prophesy that it will be successful, for we believe that a large proportion of general practitioners view with regret the tendency, which it is not difficult to perceive, for the sciences mentioned to drift apart from practical medicine. The separation has always been regretted by the clinical worker, and the evil of it is, we think, now more clearly perceived by the laboratory worker than has been the case during the last generation.

THE CENSUS.

THE Registrar-General, Mr. Vivian, who before his recent promotion to that office was deputy registrar, last week gave some results of an inquiry into the history of the census in a lecture at Southend. The knowledge that a census of peoples was taken in early ages is familiar owing to many references in the Bible, but it is not so well known that there was a census system in Babylonia prior to 3800 B.C. In Egypt statistics of population were collected in connexion with the construction of the pyramids, and statistics of the people were collected in China probably as early as 3000 B.C. In Greece there was at an early date a regular system of inquiries in connexion with the privileges and obligations of citizenship, and among the Romans a census, with similar objects, was an established practice. In this country no regular census appears to have been taken until 1801; there were, however, enumerations at an earlier date. Thus in the reign of Edward III subsidy rolls were compiled, county by county, and it was estimated that the population at that time was about two millions and a quarter. Under Elizabeth, and again under James I, the bishops were required by the Privy Council to make

returns of the numbers of families in each diocese. In 1753 a bill was introduced in the House of Commons for the annual registering of the total number of people, and of marriages, births, and deaths. The old Jewish superstition that the numbering of the people would be followed by pestilences was strong, and though the bill passed the House of Commons it was defeated in the Lords, one reason against it being the fear that the result might reveal to Continental nations a paucity of man power. The census taken in 1801 gave a total population for Great Britain of nearly eleven millions, and for England and Wales, allowance being made for some parishes which did not make a return, of about nine millions. The census of 1801 did not show any disparity in the number of the sexes, whereas the recent census revealed an excess of nearly two million females over males.

WHARTON JONES.

THE inconstancy of the relations between scientific and professional eminence on the one hand, and worldly success on the other, has seldom been better illustrated than by the career of Thomas Wharton Jones, F.R.S., of whom a short and sympathetic Life has lately been written by Sir Rickman J. Godlee, at the request of the Editorial Committee of the *British Journal of Ophthalmology*. Wharton Jones and William Fergusson were assistants to Robert Knox in Edinburgh at the time of the crimes and trial of Burke and Hare. Both Jones and Fergusson went to London to join the staffs of hospitals, Jones in 1838 to Charing Cross, and Fergusson two years later to King's College. Jones earned world-wide repute as a physiologist, comparative anatomist, and ophthalmic surgeon, but hardly enough money to make both ends meet, so that in his old age he was reduced to obscure penury. Fergusson, after making notable advances in surgical practice, became the acknowledged leader of British surgery and died rich and celebrated. That the combination of physiology and ophthalmic practice is not necessarily unremunerative is shown by the career of Sir William Bowman. The explanation of the financial failure of Wharton Jones's life is probably to be found in his idiosyncrasies and eccentricities of manner, which did not inspire medical men with confidence, and their patients still less. Certainly he seems to have been conspicuously wanting in those arts which sometimes transfer guineas from the pocket of the patient to that of the practitioner. If these were the disadvantages under which he laboured in his younger days they must have been increased as he grew older by his failure to move with the times and his indulgence in embittered controversies. After fourteen years at Charing Cross Hospital, where he impressed Huxley as a great teacher, he was appointed the first Professor of Ophthalmic Medicine and Surgery at University College and Ophthalmic Surgeon to the Hospital. Here he continued his investigations into inflammation, did much good work, and inspired Lister with his enthusiasm. He wrote much on ophthalmic surgery, but he was not very receptive of other men's ideas and failed to grasp the importance of Babbage's ophthalmoscope when that genius showed him his instrument. Had Jones been less conservative, the credit of a very great advance would have come to British instead of to German surgery. In truth, Wharton Jones, with all his good qualities, lacked magnanimity and was hypercritical and jealous of the discoveries of others. He was bitter in controversy, whether it had to do with science or with disputes as to his own genealogy and claims to heirlooms; as his biographer says, "this great little man thought as much of a supposed sixth cousinship to Queen Victoria as of his discoveries about the circulation of the blood and inflammation." He never ceased to protest against Darwinism, and he seems to have considered that his old pupil Lister was only a pushing upstart who had attempted to pick his brains. Perhaps his lonely private life and a premature crystallization of his nature are to blame for much of this. Sir Rickman Godlee tells us that in his own student days Jones's lectures had entirely lost the merits to which Huxley and Fayrer have testified, and that he was then known as "Mummy Jones." The characteristic likeness which forms the frontispiece to the pamphlet shows him as the present writer well remembers him when he had the honour of assisting him to enucleate an eye. Arriving at the patient's lodgings betimes, Wharton Jones cut short an attempt at conversation by remarking that he made a practice of sitting still and silent and composing his thoughts for fifteen minutes before any operation. Thus the operator and his assistant passed the time until the arrival of the anaesthetist. Sir Rickman Godlee describes the queer little house in George Street, Hanover Square, where Jones lived for at least thirty-five years. It was here that Sir John Tweedy found him in the winter of 1880–1881 almost starving from cold and hunger. It is pleasant to remember that the last ten years of his life were passed in comfort, and were probably happier than any that preceded them.

INTERNATIONAL CONGRESS OF EUGENICS.

THE second International Congress of Eugenics was held in New York, at the American Museum of Natural History, from September 22nd to 28th, under the presidency of Professor Henry Fairfield Osborn. Representatives attended the meeting from a large number of foreign countries, the delegates including Major Leonard Darwin and Dr. A. F. Tredgold from England. Major Leonard Darwin delivered the opening address on the history of the eugenics movement. In his presidential address Professor Osborn said that he found little promise from the practical standpoint in the "melting-pot" theory of admixture of races. All experiments showed quite definitely that the mixture of a poor stock with a good one did as much harm to the good stock as it did benefit to the poor. Eugenists saw little of promise for America in an unrestricted immigration, though it had to be confessed that at present the eugenic programme had not proved eminently practical. The sterilization of the obviously unfit was legalized in a dozen states, but was practised in very few. The idea of a standard of physical health for marriage had encountered obstacles of prejudice, and of practicability, which were apparently insurmountable. The hopeful factor in the situation was that progress, however slow and halting, could already be discerned both in the public conscience as to marriage, and in the collection and interpretation of scientific data. In the first section of the Congress—Human and Comparative Heredity—the opening address was given by Dr. Lucien Cuénot, of Nancy, France; and in the second section—Eugenics in the Human Family—by Dr. Herman B. Lundborg, of the University of Upsala, Sweden. In the third section—Human Racial Differences—the opening address was delivered by Dr. G. V. de Lapouge, of Poitiers, France. In the numerous papers and discussions stress was generally laid upon the importance of heredity, and a point emphasized was that education and environment, contrary to popular opinion, did not appear to alter racial values. In addition to the scientific meetings a number of excursions were arranged for delegates, among them one to the Eugenic Records Office of the Carnegie Institution of Washington.

CHILD WELFARE WORK IN AUSTRIA AND GALICIA.

CHILD welfare work in Austria, threatened as it was with extinction owing to financial difficulties, has been given a new impetus by the programme of the American Red Cross, which has taken over 100 welfare stations that were about to be closed, and has guaranteed financial support for twelve months. Scientific child welfare work was begun early in Austria, for the first centre was

established by Dr. Sperk in 1904; the work grew slowly but surely until 1911 when interest in it was much stimulated by the International Congress which met that year in Berlin. After the war the appalling condition of children in Austria became apparent, and a number of foreign agencies went to Vienna to give what aid they could, the most important from the scientific point of view being that sent jointly by the Lister Institute and the Medical Research Council. Many welfare stations were opened by the Society of Friends and other organizations, and free rations were supplied through them. The American Red Cross Society, when it began its child welfare campaign in Austria this year, decided that the best plan was to make use of the stations already established, retaining their staffs where possible. This relief work had three branches — the provision of rations for children under four years of age, of cod-liver oil to those children whose parents were unable to buy it, and of clothing. The cod-liver oil was sent in bulk to selected druggists' shops, and was there obtainable on presentation of cards for a definite amount, issued by the health centres. Milk for hand-fed infants was prepared in a milk kitchen conducted by each organization, the mothers paying about three-quarters of the market price for milk. In Lemberg, the capital of Eastern Galicia (Poland), a child welfare campaign is also being carried on by the American Red Cross medical unit stationed there. At intervals of two months examinations are made of several thousand children, and it has been found that those who received food at the relief stations showed a definite improvement in nourishment, weight, and height. Boys were, in general, better nourished than girls, the explanation offered being that they are more energetic and show more ingenuity in getting food, and that they are given preference over girls in their homes. Dr. Leland Mitchell, the medical director of the American Red Cross in Lemberg, states that this tendency is noticeable only among non-Jewish children, for no difference could be detected between boys and girls in the Jewish families.

LONDON WATER SUPPLY.

THE fifteenth annual report[1] to the Metropolitan Water Board by Sir Alexander Houston, the Board's Director of water examination, deals with the year ending March 31st, 1921. It is much more than a mere record of work accomplished in the Board's laboratories during a twelvemonth. There is contained in its pages the story of the purification of the raw river waters as it has been carried out since the early years of the present century. The methods of purification adopted include storage, filtration, and in quite recent years chlorination. With the principle of filtration we have been long familiar; but it was only in the year 1902 that it was observed by Houston that the number of excremental bacteria became enormously reduced as a result of storage, and in later years he found that it devitalized the microbes of water-borne diseases such as typhoid fever and cholera, that it reduced the amount of suspended matter, colour, ammoniacal nitrogen, and oxygen absorbed from permanganate, and that it usually reduced the hardness. It is evident, therefore, that the life of the filters is lengthened by storage, for the demands upon them are not so exacting as when they receive the raw water without previous storage. The system has stood the test of time, and has produced a reasonably pure supply, but it entails considerable cost in pumping. About five years ago, therefore, it was decided by the Metropolitan Water Board to chlorinate a portion of the Thames river water, and the position of the Staines aqueduct enabled this to be done without resorting to pumping, for the water could pass by gravitation from the aqueduct to the supply reservoirs. The process has been in continual operation since the middle of 1916, and a population of about two million persons have been supplied with chlorinated water without a single complaint having been received as regards taste. By substituting chlorination for storage at Staines it is stated that there is an annual saving of about £20,000, in addition to a capital sum of £50,000 which it had been proposed to spend on the Staines storage reservoir, thus showing "that applied science is the surest goal to economy." Another important advantage of chlorination over storage is that whereas stored water gives the least satisfactory results in the winter months, the results of chlorination are actually better in winter than in summer. The advantages of sterilizing water by means of a solution of bleaching powder are stated in the report to be that the treated water is innocuous, tasteless, and odourless; the process is exceedingly cheap, and the treatment confers absolute, not merely relative, protection against epidemic water-borne disease, for the typhoid bacillus and the cholera vibrio are destroyed, as judged by the total elimination of *B. coli*. In support of this last contention, Sir Alexander Houston states that in 1905 he sterilized the Lincoln water supply with "chloros," an alkaline solution of sodium hypochlorite, containing about 10 to 15 per cent. of available chlorine, and that of sixty-two samples collected consecutively no single one contained typical *B. coli* even in 100 c.cm. of water. When discussing the alleged harmfulness of chlorinated water he points out that neither at Lincoln nor elsewhere has there been any tangible evidence of injury to health owing to its consumption.

[1] London: P. S. King and Son. Price 15s.

ANTHRAX FROM SHAVING BRUSHES.

ON several occasions in the last few years we have published information in regard to the danger of infection by anthrax from the use of contaminated shaving brushes sent into this country from abroad. A further circular on this matter has been issued this week by the Ministry of Health to sanitary authorities, drawing attention to the occurrence of cases of anthrax in man, including several fatal cases, in which the infection has been traced to the use of shaving brushes the hair of which was infected with anthrax spores. It will be recalled that the Anthrax Prevention (Shaving Brushes) Order, 1920 was issued on February 9th last year, prohibiting the further importation of Japanese shaving brushes. At the same time steps were taken to trace brushes belonging to consignments known to be infected, and to secure the destruction of the brushes or their return to the wholesale dealers or importers. With regard to shaving brushes made in this country, the Minister is advised that as the hair in brushes after manufacture cannot be effectively sterilized, all practical measures must be taken to ensure that the hair used for this purpose is efficiently disinfected before the brushes are made. Attention is accordingly drawn to the methods of disinfection of hair recommended by the Home Office Departmental Committee on the disinfection of horsehair. The formaldehyde process devised for the disinfection of wool is equally efficient in the disinfection of horsehair; but this method requires the installation of special plant and machinery, and effect cannot immediately be given to it. The adequate disinfection of horsehair used for shaving brushes by means of ordinary chemical processes is extremely difficult, on account of the high resistance of the anthrax spores, and the protection afforded to them in the hair by clots of blood, grease, and other substances. The most trustworthy method of disinfection at the present time is by steam under pressure, at a temperature which should not exceed 230° F., for at least 30 minutes. The steam disinfecting apparatus should be in the hands of skilled persons; a temperature of 245° F., commonly used for the disinfection of bedding, may seriously damage horsehair. In these circumstances the Minister suggests that local

authorities possessing efficient steam disinfecting apparatus should afford brush manufacturers in their districts all facilities needed for the disinfection of hair. Special arrangements should be made for proper records of all such material disinfected.

THE UNEMPLOYMENT PROBLEM.

Our Parliamentary Correspondent writes: The speech of Mr. Lloyd George in review of the industrial situation and in explanation of the Government proposals for lessening unemployment was delivered on October 19th, and not on the 18th, the first day of the resumed session, as originally intended. It occupied nearly two hours. The Premier took up warmly the frequent assertion that nothing had been done in anticipation of what was happening; he referred to the expenditure of 48 millions sterling in unemployment insurance, which began more than a year ago; to the grant of 20 millions for relief works, which had occupied 200,000 men; and to the State-aided settlement in the Dominions of 60,000 men. As to the further steps to be taken, he spoke first of a bill to be introduced to extend trade credits, enlarging the guarantee from 85 per cent. to 100, but with the same limit of 42½ per cent. of risk; with extension of areas to which the scheme would apply. The Dominions will be included. The Prime Minister next announced that 25 millions sterling would be provided by guaranteed loans to assist in developing the means of production and transport, and in so doing find work for a considerable number of men. There will also be a grant of 10 millions sterling for relief works, which will include forestry and drainage construction. In addition to the present unemployment allowance, an unemployment fund is to be established for a period of six months, under which grants for maintenance, in no case to exceed 9s. a week, are to be allowed, at the rate of 5s. for a wife and 1s. for a child. The money is to be provided by a special levy under the Unemployment Insurance scheme, whereby every insured man is to contribute 2d. a week, the employer 2d. a week per man, and the State 3d. For young people up to 18 the contribution will be 1d. a week per insured lad or girl, with 1d. from the employer and 2d. from the State. Another bill will deal with the cases of necessitous areas. Where guardians find it impossible to cope with difficulties a Government loan will be made to help them for a period of years. For further settlement of ex-soldiers in the Dominions a sum of £300,000 is to be voted.

At the annual conference of the British Commercial Gas Association, held lately in Glasgow, Mr. J. W. McLusky referred to an investigation made some years ago by a large gas undertaking into the number of doctors who used gas fires. In a London area (which included Harley Street and Wimpole Street), of a total of 4,281 medical practitioners, 3,350, or 78 per cent., were known in 1914–15 to be using gas fires. The total number of gas fires in use by these doctors was 8,455, or nearly three fires in each house, and it was stated that the fires were as much in the residential parts of the house as in the consulting rooms.

According to the *New York Medical Record*, the New York City department of health prosecuted a physician of that city for violation of Section 118 of the Sanitary Code, which relates to fraudulent representation concerning treatment. Evidence given at the trial was to the effect that the accused had claimed that a preparation made by him was a specific cure for tuberculosis. It was proved in court that the preparation was a "gunshot" mixture of many common drugs; a fine of 500 dollars was imposed by the court. According to the *Paris Médical* a chemist and a pharmacist were recently condemned by the Seine court to a month in prison and a fine of 5,000 francs for advertising "Toxicurol," which they claimed would cure tuberculosis with less expense than any other treatment; experts testified that the remedy in question was a typical quack nostrum; the court imposed the penalty stated for the illegal practice of medicine, without taking into consideration the value of the treatment.

England and Wales.

Manchester Radium Hospital.

The Manchester Radium Institute, to the opening of the new buildings of which reference was made last week, has worked since its foundation in premises provided by the board of management of the Manchester Royal Infirmary. Under the original scheme, which was elaborated by Sir William Milligan, and brought into effect on January 1st, 1915, there were eight participating hospitals, and patients were received at the institute on the recommendation of the members of the staff of these different hospitals. In addition, private patients were seen during the afternoon by appointment. The work of the institute has gradually and steadily increased, and the accommodation at the Royal Infirmary was found to be inadequate. Through the generosity of Sir Edward and Lady Holt, a house completely furnished as a hospital has been handed over to the committee of the institute. The new hospital is situated close to the Royal Infirmary, and has accommodation for five paying and eight other in-patients. It has also eight treatment rooms for patients receiving local applications. There is a well equipped operating theatre and sterilizing room. The staff consists, in addition to the radiologist, Dr. A. Burrows, of a matron, five nurses, a physicist, a laboratory assistant, and two secretaries. The building includes a large and well-equipped research laboratory fitted up at an expense of over £1,000, and a workshop. The public has subscribed over £40,000, and the institute has recently bought some more radium and intends to purchase still more very shortly as the demand for radium treatment steadily increases. The majority of the patients suffer from inoperable malignant disease, and the results, so far as concern the mitigation of pain and the diminution of haemorrhage, are striking. The records contain many instances of carcinoma declared to be inoperable in which the patients have remained free from symptoms for periods of from two to five years after radium treatment. Inquiries are being prosecuted into the action of radioactive substances, but at present no definite opinion can be expressed as to the possibility of cures in cancer. Before Lord Derby opened the hospital on October 7th the committee, with the Lord Mayor of Manchester as *ex officio* chairman presiding, entertained Sir Edward and Lady Holt at luncheon, and presented them with a handsome silver salver.

Leeds School of Medicine.

The winter session of the Leeds School of Medicine has opened with some 250 medical students on its roll, which is about the same as last year; in addition there are 64 dental students. With so many students the medical school has absorbed the whole of its accommodation, and is making temporary use of additional premises known as the Northern Institute. It is hoped when funds are available to build an extension to the medical school at the opposite side of St. George's Road, and certain property has been acquired with this purpose in view.

The opening address of the Leeds Medical Society was given on October 4th in the School of Medicine by Mr. Harold Collinson, D.S.O., who dealt with the life and work of Ambroise Paré.

Proposed University of Reading.

Last December University College, Reading, petitioned the Privy Council for the grant of a charter as an independent university. The petition was not opposed, and the Privy Council, in its report just issued, approves the policy of establishing a University of Reading and recognizes the merits of University College. The Privy Council, however, considers that before a charter can be granted the number of students studying for university degrees must be larger and the annual income of the institution raised to approximately £80,000. The College was founded in 1892, and possesses a fine site and buildings; an endowment fund for the University, amounting to £250,000, was provided some years ago by the late Right Hon. G. W. Palmer, the late Lady Wantage, and Mr. Alfred Palmer, present chairman of the College council. The College provides exceptional facilities for education and research in agriculture, dairying and horticulture, and it possesses a

system of residential halls for students. The council of the College, in acknowledging the letter conveying the decision of the Privy Council, expresses the belief that within a short time it will be able to fulfil the conditions required by the Privy Council. The movement to obtain a university charter has met with strong support in Berkshire and the neighbouring counties, as well as in Reading itself, and the council of the College naturally expects that the approval of its work now received from the Privy Council will be generally regarded as the most significant and decisive testimony of worth the College has earned since its foundation.

POPULAR MEDICAL LECTURES AT LIVERPOOL.

At the World Service Exhibition held at St. George's Hall, Liverpool, a feature has been made of popular addresses in different branches of science. Sir Wilmot Herringham, for instance, gave an address on "Advances in medical science in my lifetime," pointing out the new birth that medicine underwent about the middle of the last century. Until this time physiology had hardly advanced at all since Harvey's discovery of the circulation of the blood in the reign of James I. The first great contribution chemistry had made to the service of medicine was the discovery of anaesthetics, but one of its most striking advances was in relation to the modern theory of vitamins. The science of biology had mothered the researches and experiments of Lister and all that they had done for surgery—advances which had taken place since he first went to St. Bartholomew's Hospital. Sir Wilmot Herringham referred also to the medical problems presented by the war, and of their successful and frequently dramatic solution.

Another lecture was delivered at the exhibition by Sir Robert Jones, on the care of cripples. He emphasized that the cure or amelioration of the cripple depended largely upon early treatment, and that there was barely a crippled child, however distorted in limb, who could not be sufficiently improved to make him an industrial asset. It was necessary to co-ordinate all activities to secure not merely education, but effective treatment on modern lines. To attain this end individual voluntary effort was essential, as no great scheme of amelioration was ever initiated by our Government. A great advance had been made by the building of hospitals in the country fully equipped and with expert staffs, such as the Welsh National Memorial, the institutions at Alton and Oswestry, and the hospital at Leasowe. The national scheme might be based on the work done in Shropshire, where there was a central hospital staffed by experts, and after-care centres in various parts of the country, visited once a week by a member on the staff of the hospital, usually accompanied by the school doctor and a representative of the medical officer of health.

Scotland.

THE report of the inquiry as to the Bellahouston Hospital is noticed at page 661.

POST-GRADUATE INSTRUCTION IN GLASGOW.

The Glasgow Post-Graduate Medical Association, of which Sir Donald MacAlister is chairman, will begin its new course of demonstrations for practitioners on Wednesday, November 16th, when Dr. Leonard Findlay will give a demonstration of medical cases at the Royal Hospital for Sick Children, Glasgow. The course will be continued each Wednesday with the exception of December 28th, 1921, and January 4th, 1922, until May 24th. The inclusive fee for the series is £3 3s. Further particulars can be obtained on application to the Secretary, Post-Graduate Medical Association, The University, Glasgow.

EDINBURGH ROYAL MEDICAL SOCIETY.

The inaugural address of the 185th session of the Royal Medical Society was delivered by Sir Dyce Duckworth in the Society's Hall at Edinburgh, on October 14th, on "Art in relation to modern medicine." Dr. J. F. C. Haslam, president of the society, presided over a large audience. Sir Dyce Duckworth said that a purely scientific education by itself could never produce the skill or essential personal qualities of a practical physician at the bedside. The first object for the physician was the study of the individual patient; the second one was the nature of the disease. In recent years many medical men seemed to have been paying much more attention to the disease than to the patient. Both kinds of inquiry were needed: the former related largely to science; the latter to medical art. The latest therapeutic novelties were not seldom snares to the unwary, and he ventured to think that they were not adequately informed as to the failure of many vaccine treatments which were now widely practised. In the wild hurry of to-day it was not recognized that therapeutic novelties and methods required long and severe clinical study. Frequent announcements in the public press of the newest alleged remedies and methods of treatment were, he believed, harmful and mischievous to many readers. Referring to the prescription of various forms of alcohol, he urged the necessity for giving instructions about their use. At the present time he believed that the average student, when he qualified, often began practice without an intelligent training and acquirement of the value of any form of alcohol in disease, its benefits, and its dangers. It was wholly a clinical question, which related to the patient, not to the disease, and alcohol must be as carefully prescribed as any article in the medical pharmacopoeia. The experienced clinician knew it was beneficial when indicated. Recent researches went to show that it tended to diminish, if anything, the output of energy of a worker; but when a man's work was done careful observers declared that a strictly moderate use of some alcoholic beverage might, if desired, be taken with some meal later in the day with refreshment and comfort to the body. He spoke next of the general failure of the panel system, and expressed the opinion that it had degraded both science and art and lowered the respect of the Government and public for the profession. Recent political changes, he added, had placed the profession under bureaucratic influences which, in his opinion, were injurious to its independence and dignity and not less to the highest welfare of the public. Speaking of the artistic side of medicine, he said that art in medicine was purely clinical. "Real art is always modest and not conscious." Buffon said, "*Le style est l'homme même.*" Medicine was not an exact science, and the art of medicine could not be transmitted. Begbie combined the scientific and artistic spirit in a high degree, and it had been said of him that he was greater than any of his books. Art in medicine was an individual acquirement, and only acquired by contact with patients at the bedside. In medicine humanity dealt with humanity, and the patient must not be regarded as a mere subject for study. Pure science could never replace art. In conclusion, the speaker referred to the value of the Royal Medical Society from this point of view. Character must not be confounded with skill. Such a society as the Royal Medical Society inspired its members to the highest aspects of the profession and the future humanity of medicine.

Dr. Byrom Bramwell moved a vote of thanks to the speaker, and referred to the brilliant quartet of clinicians —Lauder Brunton, David Ferrier, Crichton-Browne, and the speaker of the evening—who went to London from Edinburgh. For himself, he also thought that too much attention was paid to laboratory methods and not enough to the clinical aspects of disease. Some branches of physiology and pathology could only be studied in man —for example, aphasia. Observation of cases for a long number of years and a *post-mortem* examination at the end was a most valuable system; it must be remembered that clinical research was earlier in the field than laboratory methods, which followed upon clinical observation and amplified it. Dr. Davidson seconded the vote of thanks, which was heartily adopted and suitably acknowledged.

OPENING OF AYR MATERNITY HOSPITAL.

The Seafield Maternity Hospital (and Child Welfare Centre), Ayr, was opened on October 12th by Sir W. Leslie Mackenzie, of the Scottish Board of Health, in the presence of a large company. Dr. G. Douglas Macrae, Chairman of the Maternity and Child Welfare Committee for Ayrshire, presided, and in calling upon Sir Leslie Mackenzie to declare the hospital open, said that Seafield House, which now passed into the public service of the county of Ayr, had been built for his own use by Sir William Arrol, the famous engineer. The hospital was a development of the scheme of maternity and child

welfare, which had grown with such phenomenal speed during the last fourteen years. The maternity hospital made it easy for the medical man to apply his best skill, for he could rely both on the good physical accommodation of a well-ordered institution and on the presence of a team of skilled nurses. It made it easier for the mother to pass through the crisis of childbirth, and, above all, it reduced the danger to mother and child. Seafield House had been purchased by the county authorities at a cost of £16,500, and had been altered for the purpose of a hospital at a cost of £2,000; the furnishing and equipment would probably cost £1,500, but the farm which was included in the purchase would give an annual return of about £140, while this ground could be utilized at any time for the purpose of extension. The hospital, which is delightfully situated overlooking the bay of Ayr, has at present accommodation for fourteen women and thirty-four children.

Federation of Mother and Child Welfare Associations.

A well-attended meeting of the Scottish Federation of Mother and Child Welfare Associations was held in the City Chambers, Edinburgh, on October 12th. Lady Salvesen, who presided, struck the keynote of the proceedings when she emphasized the fact that it was ante-natal work that was of the greatest consequence in the welfare of children. At the present time deaths after the first month of life were being reduced, but those in the first week and in the first month (neo-natal deaths) were untouched. Mrs. Chalmers Watson, C.B.E., M.D., spoke of ante-natal factors in connexion with the dietary of expectant mothers, and laid stress upon the risks to the unborn child of bad teeth in the mother, and upon the dangers of white lead poisoning and alcohol. Dr. J. W. Ballantyne dealt with recent work among expectant mothers at the Edinburgh Royal Maternity Hospital (Department A). He drew attention to the necessity for discriminating between adequate and inadequate ante-natal supervision in judging of the results obtained. By inadequate supervision he meant the paying of one or two visits to the ante-natal clinic in the last month of pregnancy. An analysis of 1,000 cases recently seen at the clinic showed that the mothers who had adequate as contrasted with inadequate ante-natal supervision had markedly fewer stillbirths, the percentages being as 4.6 to 7.5. The pressing need was adequate ante-natal supervision, not the make-believe supervision which consisted in one visit in the last week or two, or a few days before labour. He also sketched the work which was being done among pregnant women infected with one or other of the venereal diseases.

Ireland.

Royal College of Surgeons in Ireland.

At the eleventh annual congress of the American College of Surgeons, to be held in Philadelphia on October 24th, eight famous American surgeons are to receive the Honorary Fellowship of the Royal College of Surgeons in Ireland. The fact that the honour is to be conferred on so many surgeons simultaneously may cause surprise to those who know how jealously the Honorary Fellowship has been guarded in the past, but it must be admitted the idea was well timed and graceful. The names selected are household words wherever the practice of surgery is understood: Charles and William Mayo, George Emerson Brewer, W. W. Keen, R. H. Harte, George W. Crile, John M. T. Finney, Albert E. Ochsner. In honouring these surgeons the Irish College honours itself.

A deputation consisting of Sir William I. de C. Wheeler (acting president), with Sir Robert Woods and Sir William Taylor (past presidents), was nominated by the Council to confer the degrees in Philadelphia. Owing to the continued illness of the president, Professor E. H. Taylor, Sir William Wheeler was at the last moment prevented by college business from joining the deputation. In a letter to Dr. Franklin Martin, Secretary-General of the American College of Surgeons, he wrote apologizing for his absence and said that he regarded the entry of eight famous American surgeons into their ranks as a most important and happy landmark in the history of the Royal College of Surgeons in Ireland. It was symbolic of the great admiration and regard which all Irish surgeons felt for the achievements and surgical triumphs of their American confrères, and was indicative of the cordial relationship between the surgeons of the two countries.

The strong desire expressed by the American surgeons to receive the diploma when assembled in Philadelphia next Monday, instead of in Dublin at some uncertain date, was acceded to by the Council, and the preliminary arrangements for a reception in Dublin were abandoned. Sir William Wheeler and Sir Robert Woods are to receive the Honorary Fellowship of the American College of Surgeons. Sir Thomas Myles and Sir William Taylor were similarly honoured on a previous occasion.

Opening of the Session, Belfast.

The opening address of the session of the Royal Victoria Hospital, Belfast, was delivered in the King Edward Hall of the hospital on October 13th, by Dr. McKisack, F.R.C.P.Lond. Mr. Mitchell, F.R.C.S.Ire., who occupied the chair, said, in calling upon the lecturer, that in common with every one he regretted the absence of Professor Sinclair, their chairman, who was prevented from presiding by family bereavement. After welcoming the students, the lecturer in his address dealt with a large variety of interests in the profession, and said that despite their often gloomy and anxious surroundings they were not an unhappy race: they led a full and useful life. He contrasted the clinical and the laboratory sides of hospital work, and emphasized the necessity for the student putting all his talents into the clinical work and spending more time in the study of the patient. There were opportunities for research in clinical work as well as in the laboratory, and high efficiency of all the faculties was required. To be a good practitioner it was necessary to be a good clinician; a good pathologist might fail utterly as a practitioner. Mr. Mitchell conveyed the warm thanks of the meeting to Dr. McKisack for his instructive and timely address.

National Maternity Hospital.

The twenty-seventh annual report, submitted to the annual general meeting of the National Maternity Hospital, Holles Street, Dublin, on October 14th, expressed regret at the death of four of the governors, including Dr. Walsh, Archbishop of Dublin, who could be regarded as one of the founders of the hospital. The bazaar organized by Sir Joseph Glynn realized £6,446, of which £2,200 was raised by the individual effort of Surgeon McArdle; the institution was thus freed from debt. Mrs. Gordon paid tribute to the great kindness and care shown by the staff. Sir Joseph Glynn said that everyone who went amongst the poor heard nothing but praise in regard to the hospital; during his association with it there was never a complaint; it was carried on with the utmost economy. He appealed for increased support for the institution, which was in the forefront of the maternity hospitals of the United Kingdom. The Lord Mayor expressed the hope that some philanthropist would come forward with substantial support for the hospital when the new era arrived, which they all sincerely hoped was at hand. It was not the duty of the private citizen to support maternity hospitals; their maintenance was a matter which should be looked after by the State. Surgeon McArdle said that it was the only hospital in which a patient was never refused admittance. Until the time came when the Irish State would maintain its own hospitals, as he was sure it would, they were bound to carry on the institution in the spirit in which it started. Tributes to the efficiency of the institution were also paid by the Right Rev. Monsignor Dunne, Sir Andrew Horne, and Mr. H. C. Lynch.

Health Insurance: Effects of Partition.

The proposed taking over of the National Health Insurance service by the Government of Northern Ireland was considered at a meeting of the Executive of the Approved Societies' Association of Ireland in Dublin on October 14th. Counsel's opinion on the legality of the proposal was read, and it was decided to submit it to a general meeting of the association. In connexion with resolutions recently forwarded to the Insurance Commissioners, replies were read stating that no decision had

been come to regarding the definite transfer of the national health insurance on January 1st, 1922. The correspondence also showed that every society operating in Ireland would require instructions as to how they were to deal with the separation of their members according as they were resident in Northern or Southern Ireland. Steps were accordingly being taken to hold, at as early a date as possible, a conference between the National Health Insurance Joint Committee, the Ministry of Health (England), the Board of Health (Scotland), the Board of Health (Wales), and the Irish Insurance Commission.

Correspondence.

WHITEHEAD'S OPERATION FOR HAEMORRHOIDS

SIR,—The widespread condemnation of this operation by the proctologists assembled at Newcastle-upon-Tyne at the last meeting of the British Medical Association, as reported in your issue of October 15th, compels me to urge the attention of these gentlemen to a modification of this operation, described by O'Conor of Buenos Aires,[1] which, with but little alteration, I carry out under local anaesthesia.

In making this recommendation I am aware that I may be classified in the proctologist mind as a "surgical dabbler" (*sic*), and that ridicule may be poured upon my suggestion by those who have not seen the operation performed under local anaesthesia and adrenaline anaemia of the parts. I claim that the operation can be done painlessly, practically aseptically and bloodlessly, and without stretching the sphincter; that healing by first intention follows in nearly all cases *in the whole extent of the wound;* that the operation, when properly done, is not followed by stenosis, haemorrhage, loss of sphincter control or of "anal sense," abscess, fistula, or ulceration; that the patients do not require to be kept in bed any longer, if so long, as those submitted to the other methods of operation mentioned, and that the after-treatment is simple when compared with that described as necessary after such other methods. In other respects—for example, after-pain, use of catheter, formation of tags, I do not claim that the operation has great advantages. Complaints of after-pain and necessity for use of the catheter depend largely, it seems to me, on the mentality of the patient and on the preparation and post-operative treatment of the case. With regard to treatment of tags, which occasionally form, I may be particularly "finnicky," as I like to send patients home with a normal anal region on which there are no irregularities which might interfere with proper cleansing of the part.

I prefer this modification of Whitehead's operation practically to the exclusion of any other method of treating haemorrhoids which require surgical interference. The "ligature" and the "clamp and cautery" methods do not conform to the principles which regulate surgical operations on other parts. So long as the method which I advocate gives the uniformly excellent and permanent results which my patients show I shall continue to practise it and to demonstrate it to students. It is, in my opinion, the best operation for the radical cure of haemorrhoids, and the fact that bad results follow operative attempts of unpractised hands should not condemn it in the minds of those who possess the necessary skill and training.

The question whether any operations on such an important part of the anal canal should be undertaken by men who have comparatively few opportunities of practising surgical technique is quite another matter. The bad results reported, as mentioned by nearly every speaker at the meeting, indicate the answer to the question.—I am, etc.,

Aberdeen, Oct. 17th. HENRY M. W. GRAY.

SANATORIUM BENEFIT.

SIR,—I was asked the other day by one "having authority" if I, as one of the earliest appointed tuberculosis officers, thought sanatorium benefit had been a success. I refused to answer the question, but it has struck me that the time is ripe for (1) the leaders of the profession, (2) the general practitioner, (3) those actively engaged in the treatment of tuberculosis, to have the courage or to spare the time to answer or to try to answer the following pertinent questions:

1. Has sanatorium benefit been a success?
2. Has the notification of tuberculosis been a blessing or a curse?
3. Have sanatoriums failed?
4. Should we adopt the army method of diagnosing tuberculosis by the presence of tubercle bacilli in the sputum?
5. Why is tuberculin so little used?
6. Are we, as a race, being immunized against tuberculosis?
7. Do children under 12 get pulmonary tuberculosis?

I am aware that we are suffering from the aftermath of the war, but the medical world is in a transitional stage, as it was in 1912, and decisions have again to be taken to-day and not postponed till the morrow.—I am, etc.,

J. D. MACFIE,
Tuberculosis Officer,
Colchester, Oct. 13th. Essex County Council.

"PAUPER" LUNATICS.

SIR,—You comment in the JOURNAL of October 8th on the *rapprochement* between the Board of Control and the Ministry of Health. That co-operation between these two Government departments of health is needed, is illustrated by this little fact: The Ministry of Health has been doing its best to eliminate the word "pauper" from everything within its administration; if reception orders for the county asylums do not certify in explicit terms that the patient is a pauper the Board of Control returns the order to the justice to have that word inserted.—I am, etc.,

London, N.W., Oct. 10th. E. CLAUDE TAYLOR.

AURICULAR FIBRILLATION.

SIR,—When a horse falls under a heavy load, and begins to struggle to regain its feet, the usual treatment is to sit on its head, or otherwise hold it down, to prevent its damaging itself. This treatment does nothing towards pulling the cart. In the same way the treatment of auricular fibrillation or flutter, *per se*, probably does nothing towards recovery from cardiac breakdown, though it may be very useful in preventing the auricle embarrassing the ventricle.

Cardiac breakdown associated with fibrillation appears to be usually due to dilatation of the auricle. It occurs most characteristically and permanently in mitral stenosis, and auricular dilatation is the common determining cause of cardiac failure in mitral stenosis cases.

This is indicated by the fact, to which I long ago called attention (BRITISH MEDICAL JOURNAL, February 5th, 1898), that the auricle is not found dilated in mitral stenosis cases when the heart did not fail, but the patient died from accident or operation. It is commonly found dilated after death due to cardiac failure from the stenosis; and the oncome of failure is most easily explained by the oncome of auricular dilatation previously absent. The occurrence of embolus after fibrillation, to which Dr. James Orr and Sir James Mackenzie have called attention, is in accord with the probability of auricular dilatation, which is a well known condition encouraging the formation of a clot in the auricle.

When the auricle dilates it no longer can contract efficiently, but when it thus fails as a whole, like a horse which is down, it can still kick or fibrillate.

Sir James Mackenzie says: "It should be remembered that auricular fibrillation of itself is not a dangerous or even serious condition." I would go further and say that it is not a "condition" at all. The "condition" is cardiac breakdown, usually due to auricular dilatation, of which fibrillation is but the indication.

Valuable as the study of auricular fibrillation has been, and beautiful as was the description of the cause of auricular flutter lately given in your columns by Sir Thomas Lewis and others, these are but side issues in cardiac phenomena. Quinidine sulphate, digitalis, or anything else which aids or relieves the heart beat may incidentally control them, and I have little doubt that 100 years ago they would have disappeared altogether, at least temporarily, by bleeding, and easing the embarrassed and dilated heart.—I am, etc.,

Knowle, Clyst St. George, Devon, Oct. 11th. D. W. SAMWAYS.

[1] *Lancet*, September 24th, 1910.

TREATMENT OF SYPHILIS IN WOMEN.

Sir,—In reply to Dr. Erie Evans (October 15th, p. 616), I would suggest that the cause of death in the reported case was due to a "reaction."

It is advisable in all cases of tertiary and congenital syphilis to put the patient for about a month on mercury alone or in combination with potassium iodide. The mercury will produce a reaction which is mild and extended over a considerable period. At the end of a month's treatment "914" can be administered, commencing with a small dose (0.15 gram) and gradually creeping up to larger doses, somewhat as follows, weekly: 0.15 gram, 0.2 gram, 0.3 gram, 0.3 gram, 0.45 gram. After the fifth injection an interval of about six weeks should be allowed on mercury alone. If it is desired to give further doses, start on a smaller dose than the final dose of the previous course and gradually creep up for another five doses. Any reaction can be carefully watched and the dose of 914 regulated accordingly.

It would be far safer if a somewhat similar line of treatment was carried out in all cases of syphilis. In a primary local lesion (except, perhaps, chancre of the tonsil) it is safe to start on 0.45 gram of 914, but where there is a general infection, with severe headache pointing to meningeal infection, it is better to give 0.15 gram followed in three or four days by 0.3 gram and afterwards carry on with the larger weekly doses.

It is extremely important, in dealing with out-patient injections of 914, to warn all patients, especially women, to put on some warm wrap or mackintosh when returning home after an injection. In the case recorded, the patient apparently died of a severe kidney or cerebral "reaction," perhaps aggravated by cold or draught on the railway journey, causing a contraction of the superficial blood vessels with consequent increase of the internal arterial pressure in atheromatous vessels.

Attention has frequently been drawn to the fact that a large number of patients at venereal disease treatment centres attend only once or twice for syphilitic treatment. It is possible that the administration of large initial doses (0.6 gram) may be responsible for this state of affairs, as patients often remark, "I was given an injection at ——— clinic, and it laid me out for a couple of days—I *was* bad." The average out-patient cannot afford to lose two days' work, and as a result does not attend again. *Festina lente.*—I am, etc.,

G. D. Kettlewell.

V. D. Treatment Centre,
Plymouth, Oct. 18th.

CAPILLARY PRESSURE.

Sir,—Dr. Henderson (September 24th, p. 507) states it to be a fact that "Professor Hill has never taken the pressure of the brain against the skull as a measure of the pressure in the arterioles." Dr. Hill's own words, as given in his lecture (May 28th, p. 767) were:

> "The pressure of the brain against the skull wall is due to the distension of the cerebral arterioles and capillaries by the heart, and my method, I believe, gave me a measure of the pressure in these vessels."

The method referred to was one for measuring the pressure of the brain against the skull.

My statement that the pressure in Schlemm's canal is less than that in the anterior chamber is not a mere assumption, but is based on the fact that the aqueous flows from the anterior chamber to Schlemm's canal, as shown by the experiment quoted by me in a previous letter (September 10th, p. 418) from the *Encyclopédie Française d'Ophthalmologie*, 1905, p. 139. There is no contradiction between my statement, based on the same experiment, that "the only veins into which there is a flow from Schlemm's canal are the anterior ciliary veins which lie outside the sclera," and Dr. Henderson's that "the anterior ciliary veins arise from the ciliary body and send afferent branches to Schlemm's canal before they have pierced the sclera, as well as in their passage through the sclera." When Dr. Henderson speaks of "afferent branches to Schlemm's canal" I take it that he means branches in which the flow is towards Schlemm's canal. The efferent branches from Schlemm's canal convey the blood to the parts of the anterior ciliary veins which lie outside the sclera. The simple inference from this is that the pressure in Schlemm's canal is less than that in the portions of the anterior ciliary veins which lie inside the sclera, and greater than that in the portions which lie outside it.

If Dr. Henderson holds that the pressure in all veins of the eye, and in all parts of each of them, is the same, those who are sufficiently impressed by the loftiness of the position from which he writes will accept his view. But when I find that another good authority—the one from which I have quoted above—gives data which afford a simple and reasonable explanation of how the aqueous is changed, without postulating anything that is contrary to the principles of hydrodynamics, then I prefer that other authority, even though it involves me in the unpleasantness of being in disagreement with Dr. Henderson.—I am, etc.,

John R. Gillespie.

Knock, Belfast, Sept. 26th.

Sir,—The arrogance of Dr. Gillespie's method of conducting a scientific controversy is fortunately rare. My methods of measuring the capillary pressure have been demonstrated over and over again to my colleagues at the National Institute of Medical Research, to distinguished physiologists visiting that institute, such as Professors Einthoven, Simon Flexner, Hamburger, and Professor Krogh, the last eminent for his researches on the contractility of the capillaries, to members of the Physiological Society and other medical scientific societies at no less than five meetings. I also demonstrated to the Physiological Society Dr. James McQueen's method of measuring the capillary pressure in man. Opportunity has been given to all these scientific men to criticize my methods and refute my conclusions. So far such criticism has not arisen. If it does arise it will be backed by experimental evidence and knowledge of the literature of the subject, which will meet with my respect.

But Dr. Gillespie seeks to controvert me before the medical public at large, which has no intimate knowledge of the subject, using the common trick of the politician of confusing the issues. He asks for particulars of my methods; let him study my published papers. Not only arrogance but ignorance of these, of which I may justly complain, are strikingly illustrated in his last letter (British Medical Journal, September 24th), in which he asks me to study the pressure within a toy rubber balloon when distended within an air chamber in order that I may learn that the pressure within the balloon is greater than that within the chamber in which it is distended. The innuendo being that I am using a method without knowledge of a fact which is familiar to every demonstrator of physiology who teaches the function of the elasticity of the lungs.

Now, as it happens, some twenty-five years ago I pointed out in a paper on cerebral anaemia (*Transactions of the Royal Society*), in reference to certain experiments of the late Sir Victor Horsley concerning cerebral pressure, that when a rubber bag is introduced through a trephine hole and then distended within the cranial cavity, most of the pressure recorded by a manometer connected with the bag, is spent in distending the bag and does not reach the brain. As Dr. Gillespie's ideas concerning arteries are associated with garden hose pipes, and of capillaries with hypodermic needles and rubber toy balloons, I am convinced he has no intimate knowledge of the conditions which pertain through the living animal, and has, I shrewdly believe, never seen, much less studied, under the microscope the circulation in the capillaries. In contrast with the grossly mechanical concepts of Dr. Gillespie, I ask the reader to consider with me the capillaries in, say, a minute lobule of fat in the mesentery of a mouse. We need the high power of the microscope to see the red corpuscles passing in single file through the capillaries, and with this power we scarcely see the wall of the capillaries so great is its tenuity. We see the fat cells bounding and supporting this wall, and trace the capillaries to where they join a venule or branch from an arteriole. On the edge of the lobule we may see what may be called the main vessels of supply, minute capillary-sized arteries and veins, but with a relatively rapid flow and muscular walls. I ask the reader to realize that the capillary wall is formed of living cells, of a film of protoplasm containing some 80 per cent. of water, that inside the capillary is blood, and outside tissue lymph and fat cells formed of protoplasm and droplets of oil.

I bring the mesentery with the lobule of fat upon the dome of peritoneal membrane which covers my Roy and Graham Brown apparatus, so as to flatten down the dome. I wet it with warm Ringer's solution and then bring the glass cover down upon it. On now raising the pressure in the little chamber of the apparatus which is covered by the peritoneal membrane, the fat lobule becomes compressed between this membrane and the glass cover, and we see that a very slight increase of pressure begins to slow and then stops the flow in some of the capillaries. The pressure is equally transmitted by fluid to the lobule of fat, to the fat cells, tissue lymph, protoplasmic capillary wall, and blood within the capillary. We see the flow becomes confined to the more direct pathways between the arterioles and venules. If the pulse rate is slow enough—for example, in the frog—as the pressure is raised further the flow first becomes visibly pulsatile, and finally stops as the pressure in these vessels is in its turn overcome. The pressure in the arteriole has now risen to that within the tiny main artery at the edge of the lobule which is feeding the arterioles.

The lobule behaves just as the arm enclosed by the cuff of the sphygmomanometer, and direct measurements have shown that this sphygmomanometer accurately records the arterial systolic pressure. We now observe the capillary circulation when the blood flow is arrested by ligation of main vessels, excision, or stoppage of the heart, the capillaries do not empty themselves of blood. There is no evidence of tension due to their stretched wall, of that soap film action the basis of Dr. Gillespie's primary argument. We next raise the pressure slightly in the apparatus, and see that it produces a movement of blood in the capillaries, showing that it takes very little pressure to overcome the frictional resistance. There is, then, justification for the assumption that we can measure the capillary pressure by the Roy and Graham Brown apparatus.

Dr. Gillespie attacks this method, but it is the very method by which the generally accepted textbook measurements of 40–50 mm. Hg have been made, the measurements which he upholds. No other method has, so far, been devised, except that of Basle, of cutting the finger and measuring the pressure of the escaping blood. I leave it to Dr. James McQueen to uphold the correctness of Basle's method which Dr. Gillespie attacks. The Roy and Graham Brown method has been accepted as justly applicable, and used by a score or more of physiological researchers of repute. My especial contribution is the pointing out that the pressure which stops the flow in a capillary area is not, as it is generally assumed to be, the capillary pressure, but the pressure in the small artery which feeds the arterioles supplying the capillary area. The true capillary pressure is that which just begins to stop the flow in some of the capillaries, and confine it to the more direct pathways between the arterioles and venules. This pressure is normally a few millimetres of mercury, always, in my observation, excepting the eyeball, under ten, and often only two to three.

The lowness of the capillary pressure is confirmed, not only by Basle's method, but by the common experience of bleeding. How could the escape of blood be so easily controlled from a cut and why does it so gently ooze out if the capillary pressure were 40 to 50 mm. Hg? The onus of proof is on those who assert such a pressure, not on those who deny it. The lowness of the capillary pressure is also confirmed by the direct reading of venous pressure into which the capillaries drain, the slightest increase of which congests the capillaries. Dr. Gillespie has not refuted one of my arguments, but seeks to confuse the issues. I would ask the reader also to consider in the case of the eye which is the more reasonable view—to regard the capillaries in the wet protoplasmic film of the ciliary processes as having a pressure 30 mm. Hg above that of the aqueous fluid and filtering fluid through, or to recognize, as I do, that the cells of the ciliary processes secrete the fluid and so fix the pressure of the aqueous and tension of the eyeball, the capillary pressure adjusting itself so that it is just enough above that of the aqueous to maintain the flow of blood; the eye thus doing its own business, not depending for its tension on cardiac force. When the general arterial pressure rises, or the veins are obstructed, the capillary-venous pressure rises in the eye, and that of the aqueous rising with the vascular expansion balances this, the whole being enclosed in the rigid sclera. When the aqueous is let out, the blood vessels, no longer balanced by the aqueous, dilate; the iris visibly expands with this vascular dilatation, and the vessels burst when congested sufficiently by pressure put upon the abdomen. Dr. Gillespie denies the vascular dilatation of the iris, but a single experiment on a urethanized cat will show him that he is wrong. When Ringer's fluid is forced into the aqueous chamber and the outflow of venous blood from one of the venae vorticae observed, Martin Flack and I found that the flow ceases when the aqueous pressure just overtops that in the carotid artery. Under this condition the pressure in the capillaries rises up to the arterial pressure *pari passu* with the aqueous pressure, and the flow ceases when the arterial pressure is just overcome.

It is these considerations which lead me to conclude that the capillary pressure is *practically* the same as that of the aqueous, just as in the brain it is *practically* the same as that of the cerebro-spinal fluid. In the brain the pressure is set by the secretion of the choroidal fringes, and varies with vascular changes just as it does in the eye.

All recent researches, such as those of Hamburger on the glomerulus of the kidney, show that a selective physiological permeation or secretion, not filtration, takes place through living membranes. The mechanical view of a high capillary pressure and filtration must and will be given up.—I am, etc.,

Loughton, Sept. 29th. LEONARD HILL.

SIR,—This controversy was commenced by Dr. Gillespie drawing false analogies between soap bubble films and capillary walls. To support and make plausible these false analogies he made use of a simple equation, $p_1 - p_2 = 50$ mm. of Hg. These analogies were pricked in due course and collapsed like his soap bubbles, while his equation was legitimately used by me in two ways: (1) I for the moment, accepting Dr. Gillespie's false analogies, was driven to rewrite the equation ($p_1 - p_2 = -10$ mm. of Hg) as it must be rewritten if Dr. Gillespie had proved the wall of a capillary and the skin overlying a capillary area behaved as the wall of a soap bubble film. There is no need for Dr. Gillespie worrying over a failure on Dr. Hill's part to protest that such a result must be wrong. Considering the equation was written to suit Dr. Gillespie's soap bubble hypothesis, Dr. Gillespie appears to be somewhat ungrateful. (2) Then I offered Dr. Gillespie new values for the functions p_1 and p_2. Then $p_1 - p_2 = 0$. I said these values were in all probability the best available. But (3) to oblige Dr. Gillespie once more, I am quite willing to write $p_1 - p_2 = a$ positive quantity so small as to differ from o by the least conceivable quantity. Then, again, it is utterly useless to write such an equation.

Dr. Gillespie believes $p_1 - p_2 = 50$ mm. of Hg. I shall be very glad if he will kindly state his proof, and I feel safe in saying that neither p_1 nor p_2 will be determined by frothy rhetoric about soap-bubble films, garden hose pipes, hypodermic needles, and toy balloons.

I would not trouble myself to write on this controversy again did not Dr. Gillespie, in section 3 of his letter of September 24th, 1921, once more demonstrate his method. Dr. Gillespie makes use of statements that may be perfectly true in themselves, but are inapplicable to the problem with which he deals. Thus, quoting Dr. Gillespie, "when blood vessels are severed they both retract and contract." Quite true. "Owing to the contraction there is greater resistance to the flow of blood through them, so that the blood emerging is probably at a lower pressure than there was at the same point before severance." Quite true. "Owing to free anastomosis, when the flow of blood in one direction is impeded, it can get away by other channels, thus avoiding much piling up of pressure." Quite true.

Now your readers might think Dr. Gillespie has contributed a really valuable criticism of the method of Basle. Let me analyse the method in detail. When the finger is cut and clotting of blood is prevented, it is inserted into a suitable vessel connected with a manometer. The cut, however superficial, must open arterioles, capillaries, and venules. The blood as it flows out generates pressure in the vessel as recorded in the manometer. But this pressure compresses the finger. Every capillary field in the finger, that part of it which is inside the

vessel, is compressed *pari passu* with the rise of pressure recorded by the manometer. Consequently pressure rises in all capillary fields, including the capillary fields opened by the cut. Hence there are no other anastomotic channels where the blood flow is any easier than outside into the vessel itself. Accordingly, when the flow ceases and the manometer reads, say 10 mm. of Hg or less, the pressure recorded is the arteriole pressure, and the true capillary pressure must be lower.

A severed arteriole may have its lumen narrowed, but once the pressure rises in the manometer by the blood flowing out it will ultimately reach the full pressure in the arteriole. Because when the manometer reaches its final level of reading the flow ceases and the pressure in the arteriole above the narrowed exit can be communicated by continuity of fluid even through a narrowed arteriole lumen. Consequently there is nothing in Dr. Gillespie's argument other than air, precisely as in his soap bubbles. Might I say that if he will now leave his garden hose pipe and play with the water tap in his scullery he may come to realize his error?

Your readers will note that Dr. Gillespie employs a strange blend of statements, each of which, considered by itself, may be perfectly correct, but when blended into an argument fail to apply, because Dr. Gillespie only knows as much about the subject as he can gather from the work of others. Precisely as he employed the formula $p_1 - p_2 =$ 50 mm. of Hg without first making sure of the value of the functions p_1 and p_2, so here he offers criticism of the original work of another man without taking the trouble to experiment with the method.

Dr. Gillespie has been kind enough to refer to a sentence of mine as "nonsensical." I do not believe for one moment that your readers are impressed by this. That the energy of lateral pressure and the kinetic energy of flow of a liquid are mutually convertible is well known. That they can be summed, if desired, is shown in Bernoulli's theorem and also in Professor Starling's *Fluids of the Body*, p. 109, where the sum $\frac{1}{2}mv^2+P$ is given, where P is defined as the lateral pressure exercised by the fluid on the vessel wall. It is particularly illustrative of Dr. Gillespie's method, that he has spent considerable energy in denouncing the use of an equation which is utilized by that author whose views on capillary pressure Dr. Gillespie supports.—I am, etc.,

Halesowen, Sept. 24th. JAMES M. McQUEEN.

*** We cannot continue this correspondence, though we are prepared to receive from both sides final replies, from which we hope all personal implications may be omitted.

ON THE OPERATION OF PROSTATECTOMY.

SIR,—My note of appreciation of the late Sir Peter Freyer in your issue of September 17th has been partly responsible for the appearance in your current issue of an interesting and important account of some early work on prostatectomy by McGill at Leeds.

I count myself fortunate in stimulating the production, even at the price of an unexpected charge of arrogance on my part. I did not intend to discuss the question of Freyer's claim to priority in prostatectomy in that short obituary notice; and, on re-reading it, I cannot see anything that would suggest that I personally repudiated or endorsed that claim. I have, in fact, at all times stood aloof from the discussion of priority, and I do not wish to take sides in it at this late period.—I am, etc.,

London, W., Oct. 17th. J. W. THOMSON WALKER.

SODIUM BIBORATE IN EPILEPSY.

SIR,—May I make a small contribution to the interesting discussion on sodium biborate as a remedy for epilepsy?

On the walls of the consulting room of an old friend of mine, not now living—Dr. Willmer Phillips—there hung the photograph of a little boy, beneath which his parents had written, "Cured of epilepsy by Dr. Willmer Phillips." I asked the latter one day what method he had adopted, and he told me he chanced to make use of a casual reference to this treatment in the BRITISH MEDICAL JOURNAL, after having dosed the boy unsuccessfully with bromides for a long time.

I would add that in my own experience sodium biborate has often proved most helpful when bromides fail.—I am, etc.,

Southsea, Oct. 14th. W. ASTON KEY.

LIME-BEARING FOODS FOR CHILDREN.

SIR,—I have read with much pleasure the article on pericarditis by Dr. Poynton, and am glad he has come to the same conclusion expressed by me in your issue for January 22nd of this year on page 143: "The question on which I lay great stress is whether the children of the poor get sufficient lime-bearing foods, such as milk, eggs, or cheese." Dr. Poynton says: "I cannot help feeling that it is the result of the poor food during war time which has weakened the tissue resistance."

If we are right, then it seems to me full time that the national method of feeding children should be thoroughly overhau'ed, for the children of the poor get hardly any milk, and what they do get is poor. Unless the milk vendors improve their methods we shall have no option but to set up municipal milk dépôts. As member of the Swansea Borough Health Committee I have been the means of getting a deputation of the local milk vendors' association to meet our committee so that they may have every opportunity to put their house in order before we are compelled to proceed to the establishment of a municipal milk supply.—I am, etc.,

Swansea, Oct. 15th. G. ARBOUR STEPHENS.

NECESSARY ORGANS.

SIR,—The extent to which all the organs found in animals are really necessary to their well-being and survival is a question of great biological and physiological interest. In many cases a large part of a system can be removed. We know, for instance, that the spleen can be extirpated without disaster, even if it is renewed, as seems possible from a case recently reported in your pages, by the overgrowth of a splenculus. Eight, nine, or even ten feet of the small intestine can be ablated and the patient may recover, a fact which shows that there is a large margin of intestinal overgrowth. Colectomies are also done, frequently with the best results. In all these cases there is a large reserve. But what about the liver? So far as I am acquainted with physiological research I find it regarded as an absolutely necessary organ, the loss of which entails death. That this is a fact with many or most animals I have no doubt, but observations made years ago in Australia not only raised doubts as to its universal truth, but made it clear that a herbivorous animal such as the sheep can, in certain conditions, flourish perfectly without a liver.

It is well known that that destructive trematode the liver-fluke (*Fasciola hepatica*) is yearly responsible for the death of hundreds of thousands of sheep in Great Britain. In some districts of Australia it is also a pest to pastoralists, while in the Upper Murray district I found that every sheep killed had lost a portion of the liver parenchyma, sometimes to the amount of a whole lobe. These sheep die rapidly unless constantly supplied with salt, for which they are so eager that, although usually very wild, they will pursue those who pack it into the hills for them, and fight for it when placed in the troughs as eagerly as hungry pigs fight for food. These sheep, though reckoned fit for human consumption, even if the liver is rarely, or never, eaten in Australia, were seldom in really good condition, and naturally enough, as it seemed to me then, the more advanced the hepatic destruction the worse their state. I therefore assumed that the total or practical extirpation of the liver must result in death. It was a year later when I was in the more northerly and drier district known as the Back-Blocks of the Lachlan, that I killed a ewe and saw, greatly to my surprise, that the liver was wholly of a grey glaucous hue. On turning it over I found, however, that the thin edge of one lobe still contained something like half an ounce of liver substance, an amount I cannot consider highly important in itself. This particular sheep, instead of being thin and wretched in appearance, was fat, strong, and heavier than the average merino ewe. Fluke in these drier plains I knew to be rare, since they are without permanent water, and the prolonged dry heat of summer no doubt inhibits the spread of the snail (*Limnæus truncatulus*) on which the life-cycle of the fluke depends. I came therefore to the conclusion that this particular animal had been imported when already infected. But the strange thing was that its general metabolism seemed in no way abnormal. Why was this? I can only assume that in certain conditions some herbivora can do without a liver, and, seeing

that sodium chloride usually helps sheep to live for a pastorally economic period, it seems to me now that the reason this animal did not die, or even show signs of illness, must have been due to the salinity, or other qualities, of the "salt-bush" and "cotton-bush," plants belonging to the order *Chenopodiaceae*, of the Lachlan plains.

I should be glad to hear the opinions of those better qualified than myself to judge such a case, but it certainly seems to show that in some mammals the glycogenic function of the liver is of little importance; that bile is by no means necessary for digestion; that the de-aminizing and oxidizing enzymes of the liver can be dispensed with; that in such animals, under certain-unascertained conditions, the formation of urea due to the liver is superfluous; and, finally, that the protective function of the liver as regards the products of protein putrefaction (if there are such in these animals) can be replaced by glycuronic acid or some other product of metabolism.

It cannot, I think, be imagined that a like organic disaster could be endured by the carnivora. I find in Dr. Langdon Brown's *Physiological Principles in Treatment* the following passage: "Dogs in which an Eck's fistula . . . has been made showed toxic symptoms, especially after a meal of meat. In fact, the dogs recognized this effect of meat and avoided it, living on foods which contained very little protein."

It might possibly be interesting to know if similar observations to my own have been made in Australia or elsewhere.—I am, etc.,

London, Oct. 13th. MORLEY ROBERTS.

INFLUENZA (?) WITH ERYTHEMATOUS ERUPTION.

SIR,—Since writing the letter published in the JOURNAL of October 8th another case of the same type came to my notice, but the rash, instead of disappearing like all the others, became definitely purpuric on the third day, and finally disappeared on the sixth without leaving a trace and without desquamation.

This man had very slight constitutional symptoms: headache and very slight sore throat, with 99° F. on first day only. There were no internal haemorrhages. The urine was loaded with urates; there was no albumin nor blood. This man had been already ten days in hospital for arthritis, which was treated with counter-irritants (blister), followed by the application of dilute picric acid dressings (3). It was suggested that his condition was a drug rash due to picric acid absorption. I shall be glad for references to such rashes.

—I am, etc.,

Curragh, Oct. 7th. J. E. H. GATT.

MOTHER'S EYESIGHT v. CHILD'S LIFE.

SIR,—In the BRITISH MEDICAL JOURNAL of August 30th, 1919, p. 272, I reported a case of a woman who developed albuminuric retinitis during pregnancy. Her sight was fast failing, and premature labour was induced at seven months. The patient recovered from the albuminuria, the retinitis was arrested, and what remained of the eyesight was saved.

In July, 1921, as the left kidney appeared to be more movable and larger than the right, the patient was admitted into the Royal Victoria Infirmary, Newcastle-on-Tyne, under the care of Mr. Clay; an oblique incision was made in the left lumbar region and the kidney was exposed extraperitoneally. The whole kidney was covered with cysts, and, the diagnosis of congenital cystic kidney being made, the wound was closed.

The interesting point of this particular case was the fact that so long as the patient was not pregnant there was no albuminuria; but when the extra strain of the toxin from the foetus was added the kidneys became incapable of combating with the condition.—I am, etc.,

A. G. C. POCOCK, M.B.Durh., M.R.C.S., L.R.C.P.

Shotley Bridge, Durham, Oct. 6th.

SENIOR MAJORS, R.A.M.C.

SIR,—May I venture to bring to your notice the unenviable position of senior majors in the R.A.M.C.? There has not been a single promotion from major to lieutenant-colonel since October, 1918. This means that officers who were promoted on that date, who were then six months senior to the next batch of majors below them, are now three years senior to the batch below, and are likely to become still more senior, as there seems little likelihood of any further promotions for some years to come. This may, perhaps, be unavoidable, but the hard part of it is that the promotion examination from the rank of major to lieutenant-colonel has recently been reintroduced. This means that officers whose present service is twenty years and upwards, and whose average age may be taken to be about 46, now find themselves compelled to go up for this examination, which is of a very comprehensive nature, or else retire from the service on a maximum pension of £450 per annum. It is unreasonable to expect officers of 45 years of age and upwards to repeat their experiences of the examination hall of a quarter of a century ago.

These officers have practically all held lieutenant-colonel's appointments in the field during the great war, most of them have been mentioned in dispatches several times and have received decorations. Surely it would be simple enough to select officers for promotion to lieutenant-colonel on their war services alone without the necessity for this examination.

Their confrères in the I.M.S. have no examination from major to lieutenant-colonel, but are promoted to the latter rank after twenty years' service if their record is good. All R.A.M.C. majors have passed a very strenuous and searching examination before attaining that rank, besides an examination before being promoted captain.

Had it not been for the great war, when all R.A.M.C. officers were on active service and examinations were in abeyance, these senior majors could have worked for and sat for this examination six or seven years ago, while they still had some of the buoyancy of youth remaining. It is unfair to compel these war-worn veterans to submit to the rigours and often injustices of an examination and its preliminary extra work at their time of life.

Finally, I would point out that examinations in the combatant branches of the service, from major to lieutenant-colonel, have been entirely abolished.—I am, etc.,

September 21st. MEMBER OF TWENTY YEARS' STANDING.

A SCHEME FOR VOLUNTARY SUPPORT OF HOSPITALS.

SIR,—May I bring to notice a scheme which we are using in this little town—a town which is practically made up of the working class?

I do not think that anyone wants to see the old voluntary system of hospital support die out. When the London Hospital had to close down 100 beds some little while ago I wondered what was going to happen in a district like this, where we rely to such a big extent on hospitals, and 100 beds closed means, at the very least, that 2,000 patients are denied treatment at that hospital.

At that time I was fortunate enough to get an introduction to Mr. Allen of Forest Hill, the founder of a scheme which has been working in Lee, Lewisham, and Greenwich districts for over a year now, and by means of which they are raising over £100 a week for their local hospitals. I called on the other doctors in this town to get their support. Dr. MacDonald, our vicar (the Rev. H. S. Pelham), and myself, got a public meeting together, which was addressed by Mr. Allen, who described the working of his scheme.

To cut a long story short, we adopted his scheme; in our first month we collected £108, the next month £117, and last month—our third—£133. We have sent £100 to the London Hospital, and £50 to St. Bartholomew's, and £50 to the Poplar Hospital, and have £150 in hand for allocation at our next committee meeting. Our work is all voluntary, and every penny collected is for hospital support.

The scheme is this: First the district is split up into divisions. We have split this little town up into twelve divisions. At the head there is an organizing secretary and an inspector over each division, with, if necessary, subinspectors under that inspector, and then the collectors. We do not give them much to do; we aim at twenty houses to a collector, and that does not make it hard work. We start with the idea of getting 1d. a week from each house, and of course as much more as they like to put in the boxes. The boxes are opened once a month,

and in our case with the very gratifying result that I have shown above.

I am certain that if medical men in other parts took up this scheme to float it, the results would be so great that State aid and rate aid would not be necessary at all. Our only opposition has been from the extremists in the Labour party, who maintain that hospitals should be run by the State and come out of the rates.—I am, etc.,

Barking, Oct. 14th. G. O. Pierce, M.R.C.S., L.R.C.P.

PRESENTATION TO SIR J. HALLIDAY CROOM.

Sir,—May I, through the medium of the British Medical Journal, bring to the notice of Sir Halliday Croom's old residents and clinical assistants that it has been decided through a presentation to show our gratitude to him? Unfortunately the earlier records are incomplete, and as secretary of the committee which has been appointed I should be glad if those who were with him prior to 1890 and are willing to contribute would kindly send their names and addresses to me.—I am, etc.,

Douglas Miller.

50, Northumberland Street, Edinburgh, Oct. 17th.

Obituary.

W. DOMETT STONE, M.D.

Dr. Domett Stone, whose death took place on October 1st, was at one time well known in medical and literary circles in London. He was born in 1840, the younger son of Thomas Madden Stone, who was for many years a popular official at the College of Surgeons. William Domett Stone entered as a student at Middlesex Hospital, and in 1861 became M.R.C.S. and L.S.A. In the following year he took the M.D. at St. Andrews, and in 1865 the F.R.C.S. (by examination). In 1872 the Council of the College of Physicians of Sweden conferred the honorary membership of that body on him for his valuable services in instituting an inquiry into the hygienic condition of the mercantile navies of Great Britain, Sweden, Russia, and other countries. The results of his observations were published in the *Times*, and called forth many comments in that and other London and provincial daily and weekly papers. For many years Dr. Stone edited the *Half-yearly Abstract of the Medical Sciences*, a work which acquired under his editorship the highest reputation for the ability and industry with which the essence of medical literature was condensed into its pages. He was also the author of an *Epitome of Therapeutics*, and a frequent contributor to various journals on hygienic, sanitary, and kindred subjects. In 1865, when a commission was appointed to investigate the state of the workhouses and infirmaries, he called attention to the fact that, as a rule, the education and general status of the masters was below what their official position ought to demand. He urged that an alteration of the standard of requirements for the posts of master and matron should be the first step in workhouse reform. This suggestion was warmly supported by the medical press, to the ultimate benefit of the institutions concerned. In 1889 Dr. Stone was elected a corresponding member of the Italian Association Dei Benemériti, and awarded the gold medal for scientific, literary, and humanitarian work. He was at various times resident medical superintendent, Munster House Asylum, Fulham; surgeon superintendent, H.M. Government Emigration Service; prosector, Royal College of Surgeons. He had also held the appointments of honorary physician, Westminster General Dispensary, Western General Dispensary, and Finsbury Dispensary; and surgeon, St. Marylebone General Dispensary. In early life he travelled through the greater part of Europe, America, Canada, South Africa, the Eastern Coast of the then Dark Continent, Palestine, Turkey, Smyrna, and the Near East. Of late years, owing to failing health, he has lived in retirement, but still retained his interest in current events. Although predeceased by many of his contemporaries, there are still many who will regret to hear of the passing of an attractive and lovable personality.

GEORGE WILSON, M.D.,

Formerly M.O.H. Mid-Warwickshire.

We regret to record the death of Dr. George Wilson, which took place at his residence at Colwyn Bay on September 11th. He took the degree of M.A.Aberd. in 1860, graduated M.B., C.M. at the University of Edinburgh in 1863, took the degree of M.D. in 1872, and received the honorary degree of LL.D. from the university in 1894. He took the diploma of D.P.H.Camb. in 1891, and was a Fellow of the Royal Society of Edinburgh. He had been medical officer of health for the Mid-Warwickshire Combined Districts for over thirty years, when he retired, owing to ill health, in 1909.

He was the author of a *Handbook of Hygiene*, very well known to students a generation ago. Into the eighth edition, published in 1898, Dr. Wilson introduced his somewhat heterodox views on bacteriology and the causation of disease; the book ceased on that account to be of value as a textbook, and no further editions were called for. In his presidential address to the State Medicine Section at the annual meeting of the British Medical Association at Portsmouth in 1899 he gave expression to similar views, which were much criticized at the time. He was a member of the Royal Commission on Vivisection, 1906; he signed the main report, and declined to be regarded as a representative of the antivivisectionists, but appended a lengthy reservation memorandum to the final report issued in 1912.

After his retirement he travelled for some years in Italy and other countries, but finally settled in Colwyn Bay, where the climate seemed to suit him. He suffered from cataract, and in spite of an operation the comfort of his later years was seriously interfered with by dimness of vision.

We regret to record the death of Dr. Benjamin Pope Viret of Bradford, who died on September 16th in his 55th year. Dr. Viret was educated at St. Paul's School and at St. Bartholomew's Hospital. In 1890 he obtained the diplomas of L.R.C.P.Lond. and M.R.C.S.Eng., and in 1893 he graduated M.B.Lond. After holding an appointment as house-surgeon to Dorset County Hospital he entered into private practice in Bradford, where he remained for the last twenty-four years of his life. He was for many years a member of the British Medical Association and of the Bradford Medico-Chirurgical Society, and he held the appointment of one of the factory surgeons in the city. A cultured man of wide reading, he was devoted to his profession, and did not seek the public eye. His death occurred with tragic suddenness from septic pneumonia following an infected wound contracted while he was engaged in professional duties. He leaves a widow and three children.

Professor Oswald Schmiedeberg, one of the founders of modern pharmacology, and editor of *Archiv für Experimentelle Pathologie und Pharmacologie*, has recently died at the age of 83.

Universities and Colleges.

UNIVERSITY OF GLASGOW.

The following degrees were conferred on October 17th:

M.B., Ch.B.—*D. F. Cappell, †I. Murray, †J. Wilson, †J. G. Craik, †A. H. Rankin, Alice A. Alexander, Edith A. Allan, Mary Baird, Muriel C. S. Balfour, J. J. Black, A. L. Brough, G. Brown, M. Brown, Muriel J. Brown, D. S. Buchanan, A. J. G. Caporn, Christabel L. M. Charlesworth, A. Chisholm, Jessie D. Christie, J. Connal, D. F. Craig, Margaret B. C. Craig, Elizabeth M'V. J. Currie, J. S. Currie, A. C. Dewar, J. Dewar, Vina C. MacK. Donaldson, A. M'D. Douglas, M. Douglas, R. K. Duguid, J. A. Dunlop, A. Gibb, Margaret E. Gibson, Mary D. Gilmour, Christina Gray, A. H. Greig, Beryl Grieve, J. A. Hamilton, J. K. Holmes, B. Isaacs, Susan M. S. Jamieson, F. J. Kitt, F. B. C. Livingston, Elizabeth K. B. Lockie, J. M'Dougall, Edith M. F. M'Gill, Janet S. S. Mackay, W. B. M'Queen, A. Main, T. D. Marshall, D. Meikle, N. Meilamed, Hettie M. W. Miller, M. J. Miller, Edith M. Neilson, Margaret R. Oulton, Catherine A. B. Pettigrew, Annie G. Pollock, Annabella A. Reid, Enid A. Robertson, I. MacR. Sandilands, Jessie G. Service, Marion Smellie, A. Smith, C. M. Smith, Margaret Sproule, Janet F. Steel, D. Stewart, Jane W. Stocks, Helen Y. Stoddart, John M'L. Strang, Eva M. Sturrock, H. V. Sweeney, Dorothy B. Thomson, Edith I. Thornley, R. R. Waters, C. M. Whiteford, Janette R. Wilson, Elizabeth M. Wyllie, J. Young, J. Yule.

James R. Learmouth, who graduated on July 18th, 1921, gains the Brunton Memorial Prize of £10, awarded to the most distinguished graduate in medicine of the year.

* With honours. † With commendation.

UNIVERSITY OF CAMBRIDGE.

THE following candidates have been approved at the examinations indicated:

DIPLOMA IN PSYCHOLOGICAL MEDICINE.—*Part I:* M. A. Archdale, D. N. Hardcastle, S. Kelly, R. A. Noble, W. D. Wilkins.

SANITARY SCIENCE (*Both Parts*).—†W. Buchan, ‡Dagmar F. Curjel, M. L. Dhir, *†J. H. Fairweather, *‡R. French, W. S. Gross, B. C. Haller, W. J. G. Henderson, G. W. Mitchell, P. Parthasarathy, *§K. R. Rao, H. Roger, G. W. Shore, Isabel S. Thomson, A. Tirumalaiya, E. L. Warner, R. Welch, *W. L. Yell.

* Distinguished in Principles of Hygiene, † in Bacteriology, ‡ in Practical Chemistry, § in the application of Sanitary Science.

UNIVERSITY OF ST. ANDREWS.

THE following candidates have been approved at the examination indicated:

THIRD M.B., CH.B. (*Pathology*).—T. Christie, L. Farrell, L. R. Khan, Ena McA. Liddell, J. R. Murray, N. Nelson, J. Petrie, J. A. Robb, D. B. Smith.

UNIVERSITY OF LONDON.

ST. THOMAS'S HOSPITAL.

THE following entrance scholarships at St. Thomas's Hospital Medical School have been awarded for the sessions 1921–22:

Entrance Scholarship in Arts, £25: R. A. Hill. Entrance Scholarship in Natural Science, £150: J. M. Ashton. Entrance University Scholarship, £100: divided between R. J. V. Pulvertaft and C. A. Lupton.

UNIVERSITY OF SHEFFIELD.

MR. E. H. EASTWOOD, M.B., Ch.B. Liverpool, has been appointed Demonstrator in Pathology and Bacteriology in succession to Dr. N. E. Challenger, resigned.

ROYAL COLLEGE OF SURGEONS IN IRELAND.

AT the last meeting of the Council of the Royal College of Surgeons in Ireland the following appointments were made: Professor of Surgery, G. J. Johnston, M.B., R.U.I., F.R.C.S.I.; Professor of Pharmacology, R. J. Rowlette, M.D., F.R.C.P.I.; Professor of Materia Medica, J. W. Biggar, M.B., M.R.C.P.I.

CONJOINT BOARD IN SCOTLAND.

THE following candidates have been approved at the examination indicated:

FINAL EXAMINATION.—*Medicine:* E. J. Allan, A. R. Lambie, A. S. Wickremesinghe, P. Madan. *Surgery:* A. M. Samarasinghe, Jemima M. McK. Calder. *Midwifery:* A. M. Samarasinghe, E. J. Allan, A. R. Lambie, A. V. Berge, L. R. Bergson, P. Madan, S. Ghaleb, M. S. Hassen, Jemima M. McK. Calder, F. P. Lisboa-Pinto. *Medical Jurisprudence:* Lilian M. Williams, M. Burn, J. M. Crombie, A. A. Dewar, W. O. Rodrigo, J. A. McE. Evers, J. M. McInnes, J. J. Mann, I. Rostowsky, O. Popper, T. J. Muir, Elizabeth Clark, Isobel Reid.

The following candidates having passed the Final Examination have been admitted L.R.C.P.E., L.R.C.S.E., L.R.F.P. and S.G.:

V. P. Menon, J. B. Dobson, H. P. Samuel, H. Penn, G. J. Lamprecht, Grace O. D. Evans, J. I. Hagard, Pauline Figdor, J. K. Sen, H. W. Amyes, P. E. Malloch, L. Ee Liat, S. C. Alcock, F. Walwyn, W. Campbell, L. H. Peries, J. B. O'Neill, A. R. Bellum.

The Services.

TERRITORIAL DECORATION.

THE Territorial Decoration has been conferred upon the following officers:

Territoral Army: Colonel John F. Haswell, C.I.E., M.D., V.D. (Hon. Lieutenant in Army). Army Medical Service: Colonel John Clay, C.B.E. (Hon. Lieutenant in Army). Royal Army Medical Corps: Lieut.-Colonel Charles O. Parsons, 2nd Welsh Field Ambulance; Major John H. Hobling, 2nd South Midland Field Ambulance; Major George B. Robinson, D.A.D.M.S., Home Counties Divison.

Territorial Army Reserve, Royal Army Medical Corps: Lieut.-Colonel (Brevet Colonel) Charles J. Jacomb-Hood, attached 2nd Eastern General Hospital (ret.).

AT the twenty-eighth meeting of the Italian Society of Surgery, which will be held in Naples from October 25th to 27th, at the same time as the meeting of the Italian Society of Internal Medicine, the treatment of empyema will be discussed at a conjoint meeting of the two societies, the surgical aspects of the subject being dealt with by Professor Schiassi. The other subjects for discussion will be the treatment of visceral ptosis, introduced by Professors Donati and Parlavecchio, and the treatment of renal tuberculosis, introduced by Professor Marogna. At the twelfth meeting of the Italian Society of Orthopaedics, which will be held concurrently at Naples next week, under the presidency of Professor Bastianelli, the following subjects will be discussed: Osteochondritis coxae juvenilis, introduced by Professor R. Galeazzi; treatment of spondylitis, introduced by Professor R. Dalla Vedova.

Medical News.

THE new session of the Hunterian Society will open on Wednesday, October 26th, at 9 p.m., when Professor E. H. Starling will deliver the first Hunterian Society lecture, entitled "Some heart problems." The lecture will be given at the Sion College, Embankment, E.C.1 (close to Blackfriars Bridge). All members of the medical profession are cordially invited to be present.

FORMER residents and students of the Prince of Wales's Hospital who have not received a notice of the inaugural dinner to be held at the Trocadero Restaurant on Thursday next, can obtain particulars from Mr. H. W. Carson, 111, Harley Street, W.1.

A COURSE of six lecture-demonstrations for a limited number of practitioners will be held in the *X*-Ray Department, Manchester Royal Infirmary, on Mondays, commencing Nov. 14th. The fee for the course will be £3 3s. Applications should be made to the Hon. Medical Officer, *X*-Ray Department.

MCGILL UNIVERSITY, Montreal, on the occasion of the recent celebration, conferred the honorary degree of LL.D. on Mr. J. B. Lawford, consulting ophthalmic surgeon to St. Thomas's Hospital and to the Moorfields Hospital. Mr. Lawford, who received part of his medical education at McGill University, graduated M.D., C.M. in that University in 1879.

THE Committee of the Yarrow Home for Convalescent Children, Broadstairs, is anxious that it should be generally known that the fees payable for admission of children are dependent in a measure on the means of the parents. The basis payment at present is 21s. a week, but this is subject to addition or deduction according to the means of the parents. It is hoped thus to get the maximum good and to permit those who can afford to pay more than 21s. to have the opportunity of so doing, and thus enable the institution to admit children whose parents are unable to pay the full amount. The institution is intended for children of refined and cultured parents. The secretary in London is Miss Chambers, 116, Victoria Street, S.W.

DR. SAMUEL GAWN, on the occasion of his retirement after thirty years' practice in Antrim, has been presented by his friends with an address and a cheque as a token of their esteem and in appreciation of his valued services. Mrs. Gawn was included in the presentation.

THE Alvarenga Prize of the College of Physicians of Philadelphia for 1921 has been awarded to Dr. John W. Churchman, of New York, for his essay on "Selective bacteriostasis of gentian violet." The next award will be made in July, and essays in competition, in English or with an English translation, must be received by the secretary of the college on or before May 1st, 1922. The prize is of the amount of 300 dollars and is given for an essay deemed to be of sufficient merit on any subject in medicine.

AT the fifth examination of the Central Midwives Board for Ireland on October 4th, of the 70 candidates who entered 2 did not present themselves; of the remainder, 60 passed.

THE Municipal Council of Paris has decided to establish a municipal institute of electrotherapy at a cost of 1,185,000 francs.

ON the occasion of the recent retirement of Dr. N. H. Choksy, the *Times of India* reviewed at considerable length the work he did in Bombay during a momentous period in the medical history of that city. Dr. Choksy, who was educated at the Grant Medical College and qualified in 1884, was appointed to the small-pox hospital in 1888, and has since been in charge of it, first in Grant Road and afterwards in Arthur Road, Bombay. During the five epidemics of plague from 1896 to 1901, this hospital was, at first, the only public hospital in Bombay, so that the brunt of the work connected with these serious epidemics fell upon Dr. Choksy. The number of deaths from plague led to riots among the superstitious population in the neighbourhood of the hospital, and Dr. Choksy's work had to be carried on for a considerable period under the protection of troops. In subsequent years he had to fight successive epidemics of plague, relapsing fever, cholera, and small-pox, and was recognized, both in official circles and abroad, to have performed most valuable work. Dr. Choksy took a leading part in all public health questions; he was at one time president of the Bombay Medical Union, and since 1912 has been an elected member of the Bombay Medical Council. He is also an old member of the British Medical Association.

THE twenty-first annual dinner of the Chelsea Clinical Society will be held on Tuesday, October 25th, at the Café Royal, Regent Street, W.1, at 7.30 p.m.

TWO extraordinary general meetings of the Medical Sickness Annuity and Life Assurance Society, Ltd., were held at its offices, Lincoln House, 300, High Holborn, W.C., on October 17th, under the chairmanship of Dr. W. K. Sibley, when the resolutions adopted at the meetings on September 26th (BRITISH MEDICAL JOURNAL, October 1st, p. 530) extending the scope of the company's work and also to alter the present article of association governing the d rectors' fees were confirmed.

THE annual general meeting of the National Baby Week Council will be held on Tuesday, October 25th, in the Armitage Hall, 224, Great Portland Street, at 3 p.m., under the presidency of the Viscount Astor, Chairman of the Council. The principal speaker will be Dr. Allen Daley, medical officer of health for Blackburn, whose subject will be, "The economic value of maternity and child welfare work." The address will be followed by a discussion. Tickets for the meeting may be obtained from the Secretary to the Council at 5, Tavistock Square, W.C.1.

MISS J. MELROSE, R.R.C., retired at the end of August from the post of matron of the Glasgow Royal Infirmary; she had been in the service of the hospital for thirty-five years, first as nurse and for the past fourteen years as matron.

THE *Nederlandsch Tijdscrift voor Geneeskunde* states that during August 928 deaths from plague occurred in Java.

AT the last meeting of the Glasgow University Court it was intimated that Sir John Ainsworth had presented to the university a portrait of the late Dr. John M. Pagan, who was professor of midwifery at Glasgow from 1840 to 1868.

THE *Weekly Bulletin* of the New York City Department of Health for September 10th states that the number of cases of venereal disease reported to the Health Department is too small to justify the drawing of any conclusions from the figures as to the prevalence of venereal disease in the city; it is noted that very few cases are reported by genito-urinary specialists. During the year 1920 the total number of venereal cases reported from all sources was 23,977, a decrease of 1,142 cases as compared with the total number reported in 1919.

THE report for the year 1920 of Dr. Barnardo's Homes—the fifty-fifth annual report—reflects in a very emphatic manner the magnitude of the work which this well-known charity is carrying on. On January 1st, 1920, there were 7,280 children under the care of the homes, and during 1920, 1,345 were permanently admitted to them, and 557 more were temporarily sheltered; the total number of children dealt with during the year, including those in Canada, was 20,279. Since 1866, 91,001 boys and girls have entered the homes. During the past year there were initiated departments for massage, electro-therapy, and physical remedial exercises at three branches of the homes, and it is reported that already much benefit has been received by the disabled crippled children there. Dr. G. Gushue-Taylor was during the year appointed chief medical officer in succession to Dr. Milne. The death rate for the year was only 8.45 per thousand.

THE annual dinner of the Surgical Instrument Manufacturers' Association (Incorporated) was held at the Royal Adelaide Galleries, Strand, on October 14th, under the presidency of Mr. Arthur W. Down. In proposing the toast of "The Surgical Instrument Manufacturers' Association," Dr. H. T. Maw said that the Association was flourishing, and that the annual report would give a very fair idea of what had been accomplished. With other bodies, it had taken effective action in regard to the Proprietary Medicines Bill, which, if passed, would have imposed unjustifiable restrictions on the sale of surgical appliances, and would have endowed the Minister of Health with autocratic powers in the granting of licences for sale. The question of the marking of all clinical thermometers, including those imported, with the letters N.P.L., which would have placed the British-made article at a disadvantage, was taken up with the Board of Trade. A bill which would have perpetuated the injustice was dropped, at least for the time. The Association had naturally taken the keenest and most active interest in the Safeguarding of Industries Bill, Dr. Maw expressing the opinion that the present position as to unemployment was due to inflated wages, combined with limitation of output. It was the workers themselves who suffered most, but, unfortunately, the Government had led them to believe that somewhere there was an unlimited fund from which wages could be supplemented, and they failed to realize that if the public declined to pay the prices asked there could be no trade, and consequently no wages. The Surgical Instrument Manufacturers' Association intended to fight for fair wages for a fair day's work.

AT the recent meeting at Droitwich of representatives of the British Spa Federation (Bath, Buxton, Cheltenham, Leamington, Droitwich, Harrogate, Llandrindod Wells, and Woodhall) Mr. J. H. Hollyer, director of the Droitwich Baths, referred to the fact that at some Continental resorts the doctors not only ordered a system of diet, but saw that the hotels provided it, while the hotel proprietors also arranged the hours of meals to suit the needs of those taking treatment. British hotels and other establishments were prone to view the matter in a commercial spirit, and fixed meals which were often inconvenient for invalids, and, moreover, resulted in great pressure at the bath-houses during certain times of the day. In fact, English spas were lacking in the co-ordination which had done much to popularize foreign resorts. He regretted the lack of knowledge of the value of the various English springs and of spa treatment generally amongst medical men other than those practising at the spas; this was largely because the study of spa treatment was not a part of the medical curriculum. Much might be done to improve matters by the establishment of chairs of hydrology in the University of London and elsewhere.

IT is announced from Geneva that a Jewish organization, the Red Shield of David, has been formed, which will be managed on the same lines as the Red Cross, and which intends to work in association with the League of Red Cross Societies and the Red Crescent. Several leading Jewish medical men and philanthropists are at the head of the movement.

THE twenty-sixth Dutch Congress of Public Health will be held on November 11th and 12th at Arnheim, when a discussion on the destruction of vermin will be opened by Drs. H. G. Ringeling and Wolff.

Letters, Notes, and Answers.

As, owing to printing difficulties, the JOURNAL *must be sent to press earlier than hitherto, it is essential that communications intended for the current issue should be received by the first post on Tuesday, and lengthy documents on Monday.*

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.*

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London*; telephone, 2630, Gerrard.

2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London*; telephone, 2630, Gerrard.

3. MEDICAL SECRETARY, *Mediscera, Westrand, London*; telephone, 2630, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin*: telephone, 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh*; telephone, 4361, Central).

QUERIES AND ANSWERS.

J. P. D.—Applications by those entitled to war medals should be made to the Medals Branch, War Office, Pilgrim Street, London, E.C.4.

INCOME TAX.

"DUPLEX" asks for the grounds on which it has been stated that cash coming to hand after the practitioner has retired from work is not liable to income tax in his hands.

*** It is an established principle of income tax law that an assessment to tax can be made only in respect of an existing source of income. An assessment on professional earnings can therefore be made only so long as the professional work continues. The cash subsequently received differs in no real sense from the realization of a trader's assets when he has ceased to trade, and his book debts are no more liable to taxation than the value of his stock-in-trade when realized. While a medical practitioner is in professional work he is assessed to tax for his *full* income—measured for convenience on the (gross) basis of his cash receipts—and his liability

ceases as from the date of his retirement. Conversely, when a practitioner commences the Revenue officials decline to accept as a fair basis of assessment the gross receipts in cash, claiming, and rightly so, that in such a case the cash basis does not provide a fair measure of the value of the full earnings of the practice; it is surely clear that if a practitioner is thus called upon in the early years of his work to pay upon more than the cash receipts, he should not be held liable at the end of his work in that practice to account for tax on the then unrealized arrears of fees. It would be interesting to know whether in this case "Duplex's" successor is paying on a cash basis only; if so, he would seem to be assessed at less than his full earnings; if not, then a portion of the income of the practice is being charged to tax twice over.

"A. R." asks: Can a practitioner claim an allowance for depreciation of his car? If so, on what basis?

*** An allowance for depreciation is given by the statute only in the case of trades, manufactures and similar concerns; it does not apply to professions. [This injustice was represented to the recent Royal Commission by the Treasurer of the British Medical Association.] What a practitioner is entitled to is to regard the cost, as at the date when it was incurred, of replacing a car as a current professional expense.

"G. E. P." bought a second-hand car in 1919 for £170 and sold it in August, 1921, for £150, buying a new car for £500.

*** The cost of renewal is £*x* – £150, £*x* being the cost as at the date of purchase of the £500 car, of a car of similar power, quality, and condition to that purchased in 1919. Any expenditure over and above that amount represents capital laid out in improvements.

"C. G. R." bought a new 15-h.p. Studebaker (1912 pattern), laid it up during the war, and cannot now obtain spare parts or sell the car. Last year he bought a new Eric Campbell 10 h.p. car for £530. The inspector proposes that an allowance of £350 should be made, less £100 for the estimated selling price of the old car.

*** As regards the old Studebaker, if it is useless we suggest that our correspondent might get rid of it for what he can obtain and so have a definite basis of claim. The £350 figure may be right or not; the amount should be the 1920 cost of a new 15-h.p. Studebaker or a similar car.

"R. P. R." and his partner have taken over a practice and are being assessed on their bookings, less 20 per cent. for bad debts, instead of on the cash receipt basis. He asks if this is correct.

*** Yes; the assessment has to be made on the full income of the practice, and it is only when the practice has been worked for a year or two that the cash receipts will furnish a proper measure of that income.

Allowances for Repairs.

"J. D. D." inquires as to the recent extension of the allowances to owners for the cost of repairing property. He owns his own residence.

*** The law on the subject is contained in the following sections: Income Tax Act of 1918, Rule 8 of No. 5 Sch. A, Finance Act, 1919, §19, and the Finance Act, 1920, §29. Their combined effect is that a claim to repayment may be made on the excess of the average cost of upkeep for the five preceding years over the flat rate allowance made automatically in the form of the deduction of one-sixth from the gross rental. The expenses forming the subject of claim would include all those which would normally be incurred by a landlord letting a house on an annual tenancy, but excluding improvements, and would cover fire insurance.

LETTERS, NOTES, ETC.

A Disclaimer.

Dr. J. R. Bentley (Limpsfield, Surrey) writes: There has recently appeared in the popular press an account of some cases of belladonna poisoning. My name was mentioned in connexion with them, but the account was published without my knowledge or consent.

Faith or Fact?

Dr. Haydn Brown (London, W.) writes: It is reported in the British Medical Journal of October 15th, 1921, that Sir Frederick Mott, in his address on the occasion of the prize distribution at Charing Cross Hospital on October 5th, remarked that "if he had the opportunity of again teaching physiology he would, especially in the light of the experience of the last eight years, give a special attention to the influence of the mind on the body, and of the body on the mind. It had always seemed to him that doctors had neglected this branch of medicine too much, and the consequence had been Christian Science, faith healing, neuro-induction, and other modes of inspiring faith." Thus he has so obviously classed neuro-induction with faith healing that I have had letters from medical men expressing a good deal more than astonishment. I am the author of nearly 1,000 pages on neuro-induction published for medical men, and there is studious avoidance of either mystery or faith healing from beginning to end. The technique directly forbids any blind confidence; it involves throughout the most perfect system of direct education for mentally disordered patients to be found in medical literature. Sir Frederick Mott's words are offensive to those medical men who know that neuro-induction is instinct with true and valuable science, and I sincerely trust that you will in all fairness give me space in the Journal to refute his misleading reference to my work.

Degrees and Diplomas.

"Triple Qual. 1883" writes: This is a very old grievance. Years ago I contributed much to this discussion. I suggested then, and now, one degree, M.D. for Great Britain, attainable by any legally qualified practitioner after, say, five years' practice. No university should be allowed to confer a degree higher than M.B. One British coalition of universities and colleges should examine for the only M.D. (Great Britain). Every physician and surgeon could then, in a reasonable time, get upon an equal footing, if so disposed. Until that time I advise all practitioners to call themselves Doctors, if they wish, as by courtesy they always are called.

"Conjoint" writes: My working years are drawing to a close, and such success as I deserve—or perhaps more than I deserve—has been mine; so that the following remarks are not written during the aftermath of failure. The teaching and material for training the London medical student is second to none in the world. The possessor of the "Conjoint" qualification holds a high place in competitive examinations. Until a few years ago the College of Physicians of London did not permit its licentiates to use the title "Dr." A member of the Royal College of Surgeons has often not the time, money, or perhaps the mental capacity, to study for the Fellowship, and so goes elsewhere to get a similar sounding title. The general practitioner has to live, and public appointments are a certain form of income; these appointments are generally made by representative bodies, who naturally think more of a Bachelor of Medicine than a Licentiate, or of a Master of Surgery than a member of a college, the M.D. in their opinion is the acme of greatness, no matter where obtained. The Colleges of Physicians and Surgeons of London must insist on obtaining the power of conferring degrees. They must "wake up." They are eminently cultured and held in high esteem by the profession—two virtues liable to be non-creative. Parliament would not refuse the means of getting over legal difficulties, as it would be no cost to the State. Surely it is for our professional leaders to lead. My advice to those desirous of entering the medical profession is the following: "London will give you the best teaching and material and the worst professional label, so unless you have the capacity to take the M.D.Lond. and the F.R.C.S.Eng., go to a provincial school where you can get a better professional title; you can utilize London later." It is interesting to note the number of men holding the London University degree on the London hospital staffs; the majority hold provincial degrees. My protest is a hardy annual, and I fear the powers that be will let it remain so.

Vacancies.

Notifications of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 29, 32, 33, 34, 35, and 36 of our advertisement columns, and advertisements as to partnerships, assistantships, and locum tenencies at pages 30, 31, and 32.

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